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Supplementary Materials for

Body-size reduction in vertebrates following the end-Devonian mass extinction

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Materials and Methods

Datasets

Our main dataset contains body sizes for 1124 Devonian-Mississippian vertebrate occurrences, most of which represent named species (Table S1). Body size was represented by lateral total length (snout to end of tail) of the typical adult specimen of each taxon as described in the literature (Table S1). Our dataset is estimated to contain at least 75% of described genera and 90% of published species with macrofossil material (see Figure S1 and *15*). Remaining named taxa either lack appropriate body fossil descriptions, figures, and/or photographs in print and online.

Many of the missing taxa are only known from microfossil material such as teeth or scales. There is also no established relationship between fish scale and tooth size and total length as these elements vary along the body, grow throughout life and may be replaced (*5, 33*). Different scale and tooth taxa may also represent different sections of the same animal (*34*). These latter exclusions explain the increasing gap between number of known genera and recorded body sizes in the Mississippian versus the Devonian (Figure S1). The number of chondrichthyan tooth form taxa rose dramatically beginning in the Famennian. Most of these taxa lack body fossils (*34*). That said, the vast majority of Mississippian shark teeth, including isolated tooth plates which may represent a significant portion of the jaw, are qualitatively much smaller than their counterparts in Mesozoic and Cenozoic oceans (*14*). Therefore, they may fall in line with the expectations from body fossil results.

Body sizes were recorded on a per-occurrence and per-species basis and were thus treated as independent data points. Ghost lineages and occurrences lacking specific size data were excluded from this study, even when data were available for the same taxon elsewhere in the record. As a result, trends could be examined both within and among lineages with reduced risk of phylogenetic constraint biasing the overall signal (e.g. *Bothriolepis* in Figures 1C and S4C and Table S1). Total lengths were collected from published descriptions where stated in the text and extracted from published photographs of complete type specimens or lateral reconstructions using the measurement tools in *ImageJ* (*35*) and embedded scale bars. They are likely to fall closer to average adult size than maximums. Many Paleozoic vertebrate taxa are only described from disarticulated skeletal pieces or incomplete specimens but are nevertheless diagnosable to the genus level. As these components can scale with total length, body size was estimated by extrapolating the scale of available material onto images of articulated or reconstructed close relatives (same genus, or family if gross ecomorphology was similar) in *ImageJ.* Estimated total lengths are marked by an asterisk in Table S1.

Absolute dates are lacking for most Paleozoic vertebrate occurrences and faunas. In addition, relative dates are normally given as ranges up to 5 or 10 million years (*13*, *16*). For time series analyses, we binned our length metrics according to geological stage and assigned an age equivalent to the stage midpoint in the *Geological Timescale 2012* (*36*). Taxon occurrences with uncertain ages encompassing multiple stages were included in each stage to avoid introducing bias. This resulted in 1325 binned datapoints (Table S2) and might have increased the conservatism of the trends shown here. Binned body length data were transformed by Log_{10} to reduce the effects of allometry (*2, 8;* Table S3).

In order to determine the role of climate parameters, we sampled temperature and oxygen values from published datasets for the Devonian and Mississippian. There exist multiple estimates from various models and proxies and these conflict in terms of absolute values and trends (Tables S7, S9; Figs. S7-S9). We therefore sampled values from multiple datasets, under the assumption that if there were a relationship, then the models showing that would be the most accurate. Oxygen level estimates were taken from multiple conflicting sources, including *COPSE* model pO^2 estimates (*39*), *GEOCARBSULFvolc* atmospheric O^2 percentage estimates (*17* in *38*), and atmospheric O^2 percentages calculated from charcoal remains (*39;* Figure S7, Table S7).

We considered using the Mo-based sea oxygenation proxy produced by Dahl et al. (*11*) and previously compared to vertebrate maximum size. However, their published dataset only contained values from drill cores at single localities from three of our time bins (Givetian, Frasnian, Famennian). These diverged widely between sampled layers. The original authors summarized these values using the 90th percentile line for the entire later Phanerozoic, Devonian to present. Thus, it was not specific enough for our purposes.

Temperature-related datasets included pH-adjusted sea surface $d^{18}O$ (Figure 4 in *16*, also used in *40*), COPSE model temperature estimates (*37*), COPSE model pCO^2 estimates (*37*), paleosol pCO^2 estimates (*41)*, *GEOCARBSULFvolc* atmospheric CO^2 ppm estimates (*17* in Figure 2a of *38*), and averaged atmospheric CO^2 ppm estimates from multiple proxies (Figure 4b of *42*; Table S10; Figs. S8, S9). As these proxies and models were sampled at different intervals, we used the Figure Calibration plugin (*42*) in *ImageJ* to capture values for the stage midpoints. Midpoint dates were based either on in the last version of *The Geological Time Scale* at the time of publication (*36, 43, 44*) or the version used by the original authors.

In order to account for potential biases in the vertebrate fossil record, we tracked body length distributions for species in well-sampled vertebrate faunas. We first compiled lists of all Devonian and Mississippian localities bearing at least five taxa with *in situ* body length values falling into at least two size classes. In order to avoid taxonomic and taphonomic biases, we removed faunas for which body size data was available for fewer than three major vertebrate divisions ("Placodermi," "Agnatha," "Acanthodii," Sarcopterygii, Actinopterygii, Chondrichthyes). Taphonomy was controlled for by extrapolating sizes as above; all these groups exhibit the same types of hard tissues (dentine, enamel, calcified cartilage and bone) and so pieces of large specimens are as likely to be preserved as small specimens in the same depositional environments (*45*). Thus, we can infer that absences are real (*45*). No vertebrate taxon in our dataset, and no Paleozoic vertebrate taxon larger than 1m, is known from soft tissue alone. Exceptional or poor preservation should therefore have affected all body sizes equally in our faunal samples.

We binned the raw body lengths from the selected localities into size classes (Figure 2A; Table S14). Higher size classes covered greater size ranges (~100 cm within classes representing over 100 cm in total length versus 20 cm for size classes under 100 cm in total length) in order to mitigate the scaling issues mentioned above. This had the effect of reducing the relative influence of very large taxa on our results but also limited the weight of their absence, again providing a conservative estimate. We generated a matrix of per-site size occurrences, with faunas as rows and size classes as columns, in order to analyze changes in size composition over time as below (Table S14).

Analyses

We implemented linear regressions in PAST (*46*) to determine the significance and effect size of correlations between Log-transformed body lengths and age (Tables S3-S5; Figures 1, S2-S6). This was done for the overall dataset, Devonian and Mississippian subsets, as well as major divisions and subclades with more than five samples (Tables S4, S5, S19, S20, S22-S30, S32-S37; Figs. 1, S2-S6, S16-S91). Ordinary Least Squares (OLS) was applied as the midpoints of our time bins are relatively fixed (*37*), and age may only affect body the length distributions, not the reverse. We also performed Reduced Major Axis (RMA) analyses as there remains uncertainty in the exact age of samples within our time bins, and the stage lengths themselves have reported margins of error (*37*).

We found that OLS and RMA generated nearly identical effect sizes and probabilities, thus choice of model did not affect the overall results. The main difference between the models was the resultant slope, with OLS trends lines matching the reported means more closely. OLS results were reported in the main text and Figure 1. We also performed pairwise non-parametric Mann-Whitney U tests between temporally consecutive binned samples (Tables S6, S21, S38-S40).

Body size data for the Devonian and Mississippian was fitted to oxygen and temperature estimates from each of the aforementioned sources (Tables S7, S9; Figs. S7-S9). For these analyses, we both OLS and RMA regressions for the reasons given above (Tables S8, S9, S11, S12; Figs. S10-S13). Few of the estimates produced significant correlations and only the *GEOCARBSULFvolc* atmospheric O_2 model (*17* in *38*) and the PH-adjusted dO_{18} sea surface temperature model (*16*) showed measurable effect sizes (Tables S8, S9, S11, S12; Figures S10-S13). Stage mid-point values from these two models were used to represent climate parameters in subsequent analyses.

We used the R time-series analysis package *PaleoTS* (*47*) to fit several models of trait evolution to various iterations of the binned size data. Models included general random walk (directional trend or active selection), directional trend with a shift (for the overall Devonian-Mississippian data), unbiased random walk, stasis, reversion to central tendency (Ornstein-Uhlenbeck process) and covariance of first differences with those for temperature or oxygen values. We calculated means and variances for Log-transformed body lengths for each stage in the overall dataset (Table S3), Devonian subset, and major Devonian divisions and clades with more than five datapoints in the entire time series. Mississippian-specific data and lineages appearing in four or fewer stages were not subjected to individual model-fitting tests as *PaleoTS* cannot detect directional trends in time series with less than seven points (*48*).

The multivariate version of the *PaleoTS* function can detect coordinated trends among shorter time series that span at least seven points total, although it cannot currently detect shifts. We performed multivariate tests for all Devonian vertebrate divisions and all well-sampled Devonian subclades as listed in Figures 1B and 1C using directional, random walk and stasis models and covariance with oxygen or temperature. All model-fitting exercises were performed using the joint method, which is more sensitive to directional trends in smaller datasets with uneven sampling, such as early vertebrates (*48*). Best fit was determined by using log-likelihoods to calculate the Akaike Information Criterion and Akaike weights (AW) for each model (Tables S13, S22, S31).

We next analyzed our matrix of binned body lengths in well-sampled vertebrate faunas to see whether global trends were mirrored at the ecosystem level or biased by local sampling. The matrix was first used to generate a histogram for visual inspection of trends and outliers (Fig. 2A). The faunas were then binned by stage and subjected to Analysis of Similarity (ANOSIM), a stage-based pairwise permutation test with one million replicates, in PAST (*46, 15*). This showed the significance of changes in the distribution of faunal size composition across stage boundaries (Table S15). We also calculated Similarity Percentages (SIMPER), again in PAST, in order to track changes in relative contribution of size classes to faunal distributions in adjacent stages (*15;* Table S16). Finally, the faunal body size matrix was subjected to non-parametric multidimensional scaling (NMDS; Tables S17, S18; Figures 2B, 2C, S14, S15) in order to tease out the main axes of variation in the data and visualize faunal patterns apparent from the histogram, ANOSIM and SIMPER (*15)*. This was used to plot the size class "ecospace" seen in Figures 2B and 2C. Points along the first two coordinates were binned by time interval (Early, Middle and Late Devonian; Early, Middle and Late Mississippian).

Supplementary Text

Cope's Rule in Devonian Vertebrates

Model-fitting exercises strongly favored a directional trend among Devonian vertebrates (AW=0.97), independent of changing environmental parameters which received little or no support as drivers (oxygen AW=0, temperature AW=0.29). The majority of vertebrate divisions exhibited significant length increases over the Devonian (Tables S17-S19), particularly the numerically dominant and ecologically diverse "Placodermi" and lobe-finned Sarcopterygii (Figures 1B, S8, S9). The seemingly static exceptions were Tetrapoda and "Acanthodii" for reasons of taxonomic practice (Tables S17, S18). Sarcopterygii is paraphyletic with respect to the twelve Late Devonian tetrapod genera (*5*), and the latter appear at relatively large sizes (Table S1).

Acanthodian affinities are debated, but they are likely paraphyletic stem-chondrichthyans (*49*). Combining "Acanthodii" and Chondrichthyes produces a significant trend line nearly identical to the latter alone (Tables S17; S18, Figures S28, S29). Worker bias may produce a size filter: smaller and earlier disarticulated forms are designated acanthodian while larger later fossils are termed chondrichthyan. Despite these exceptions, multivariate model-fitting strongly favored a coordinated, directional trend (AW:0.94; Table S20); a true Cope's Rule phenomenon.

It is notable that none of the Devonian clades recorded a significant size reduction. Other trends among Devonian vertebrates are also of particular interest. Jawless fishes ("Agnatha") show their most significant increases following the takeover of vertebrate ecosystems by jawed fishes in the Emsian (*14;* Pragian vs. Emsian Mann-Whitney U p: 0.045; Table S20) despite first appearances in the Silurian (*5*). Indeed, widespread jawless stem-gnathostome clades, the Osteostraci and Heterostraci, increase their size significantly in the early-mid Devonian (Tables S20-S22, S27, S36; Figures S30-S33). The benthic antiarch *Bothriolepis*, the most widespread, abundant and speciose Devonian genus (*5, 15*), tracks the trend of the global vertebrate fauna (*5*, Figures 1C, S4, S38-S39; Table S23, S24;). Multivariate model-fitting again supported an overall directional trend for these subclades (AW:0.99; Table S29).

Changing size structure at Devonian localities reflects the overall Cope's Rule trend. The vast majority of species at early Devonian sites fall within the smallest size classes (>40 cm body length); very few taxa were over 80 cm (Tables S12, S14). Occupation of larger size bins increased over the Devonian in line with a decline in per-site small taxon diversity (Figure 2A; Tables S12-S14). When taken with the overall dataset, these faunal results suggest that entire structure of Devonian vertebrate ecosystems, from large apex predators to benthic detritivores, exhibited a coordinated trend toward larger body sizes. As a significant role for abiotic drivers was previously rejected, biotic factors, such as ecological interactions, must have largely underlain the Cope's Rule body size trend across Devonian vertebrates.

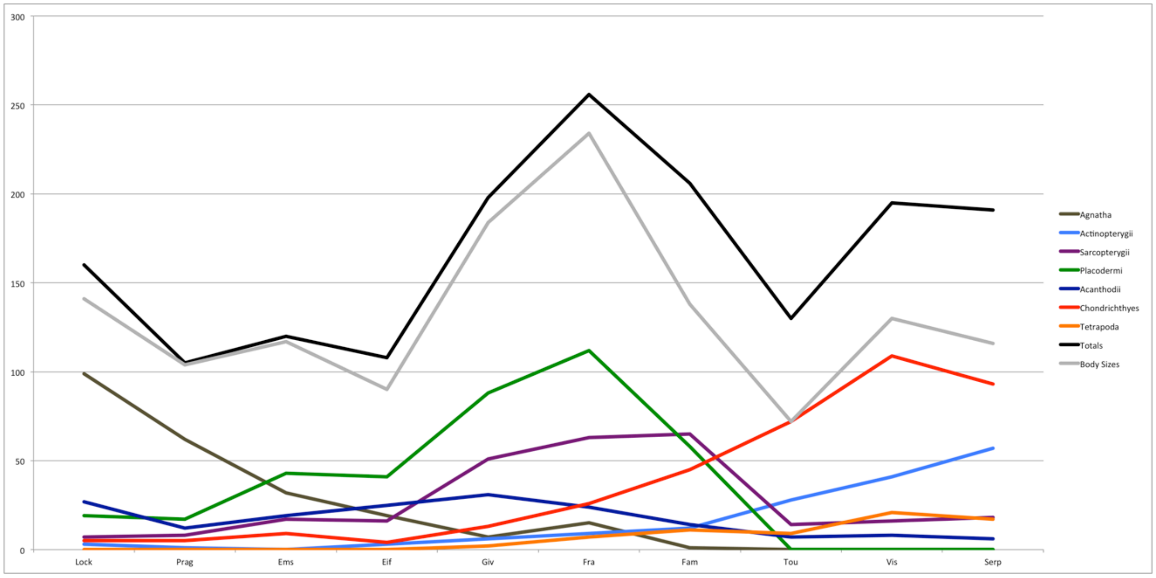

Fig. S1.

Devonian-Mississippian vertebrate genera and body size counts. Number of genera per stage for all vertebrates (black) and major groups (see key). Grey line represents the number of recorded body lengths. The gap between genera and sizes in the Mississippian is largely due to an increase in shark tooth forms post-extinction. These cannot be used to reliably estimate body size.

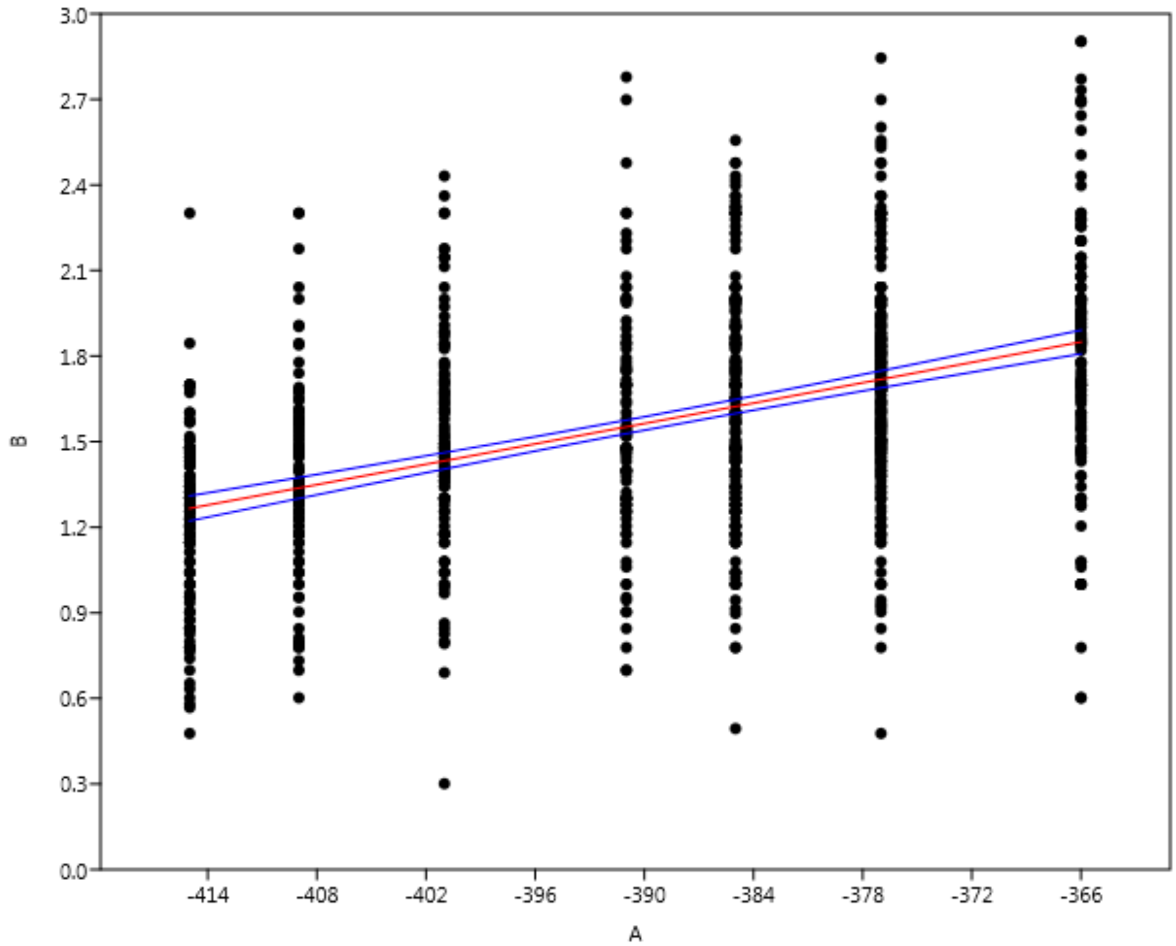

Fig. S2
OLS regression: Devonian Log- size/age (Ma; n=1006). See Table S4 for metrics.

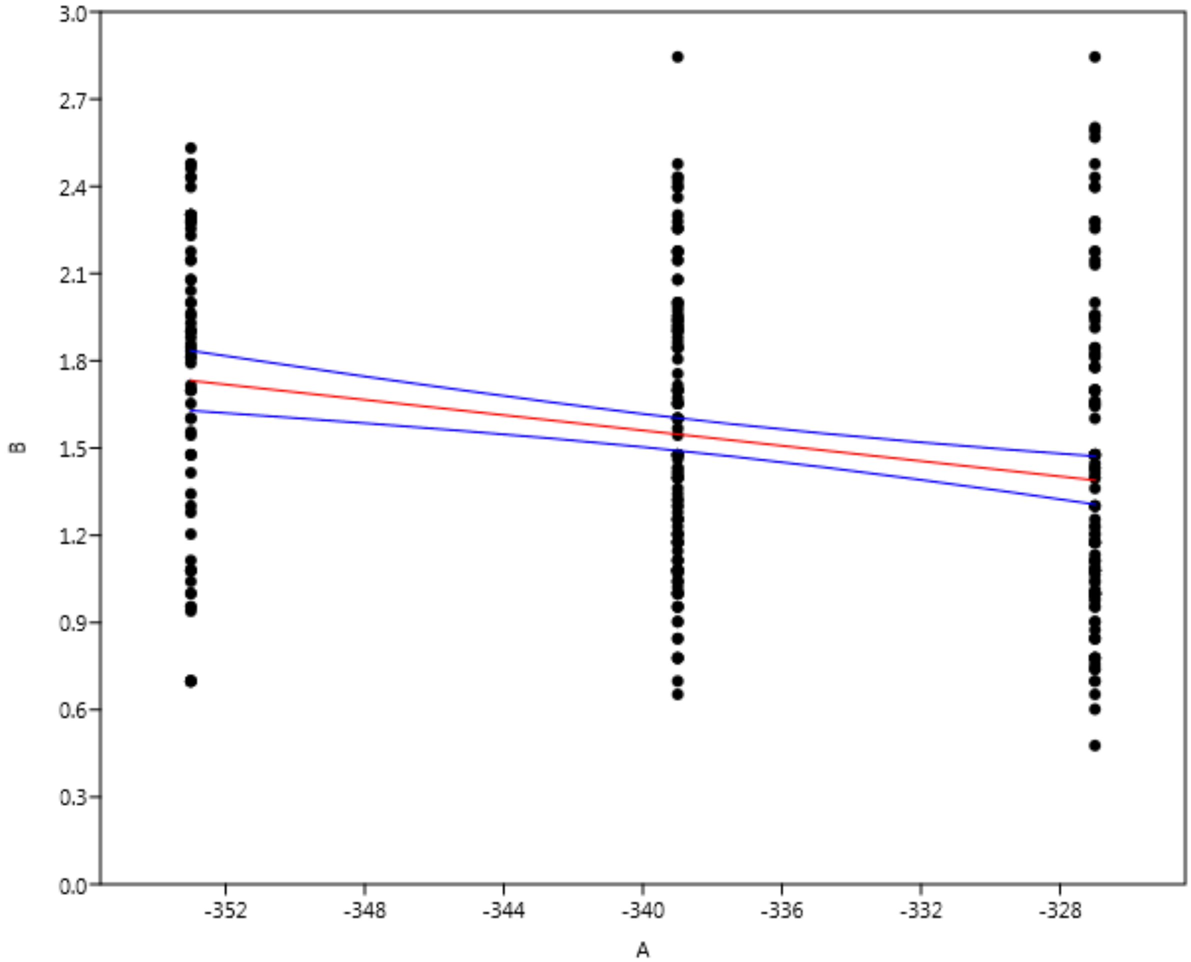

Fig. S3
OLS regression: Mississippian Log. size/age (n=318). See Table S4 for metrics.

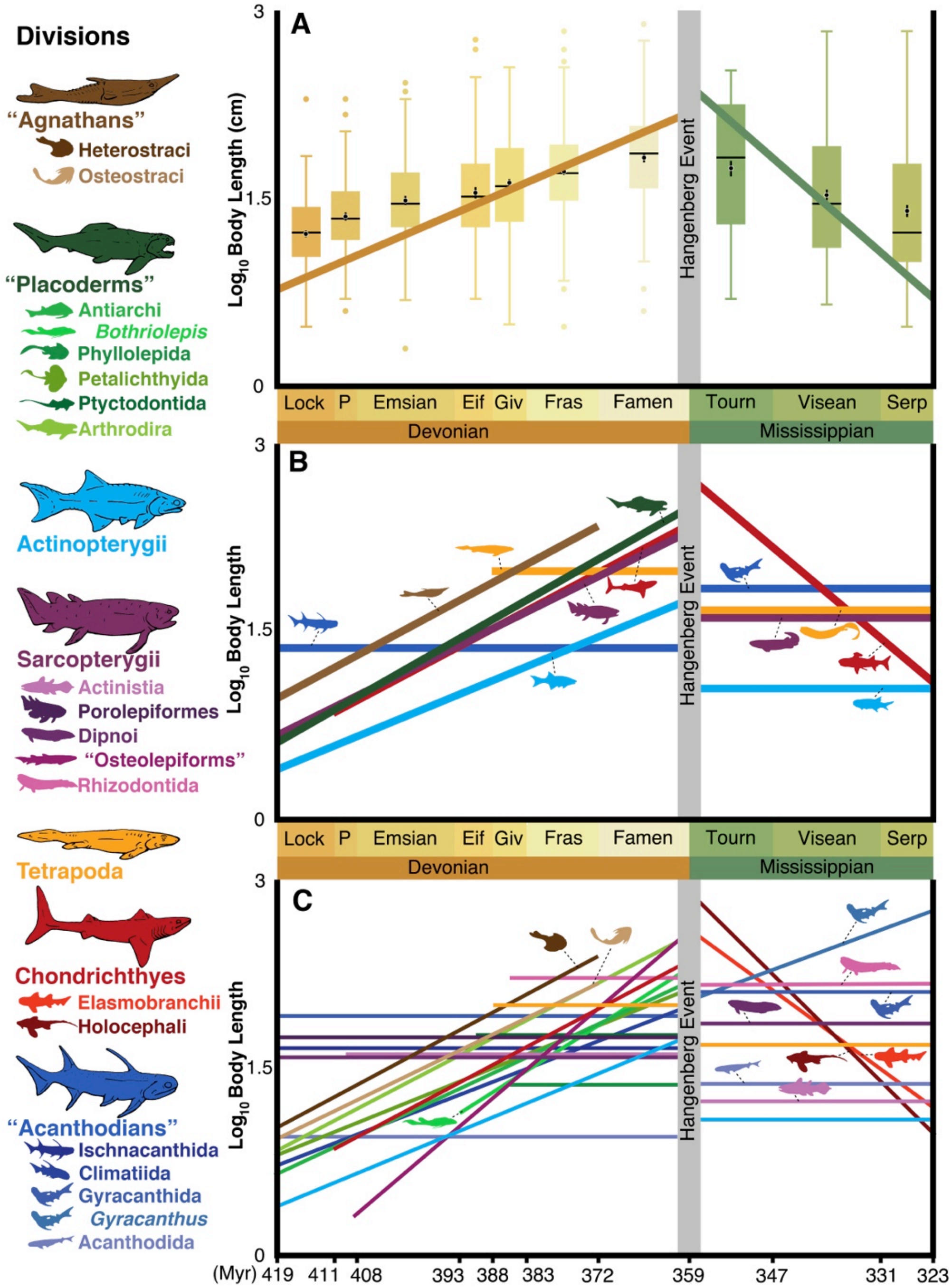

Fig. S4.

RMA regression version of Fig. 1. See Fig. 1 caption for key and Tables S5 for metrics.

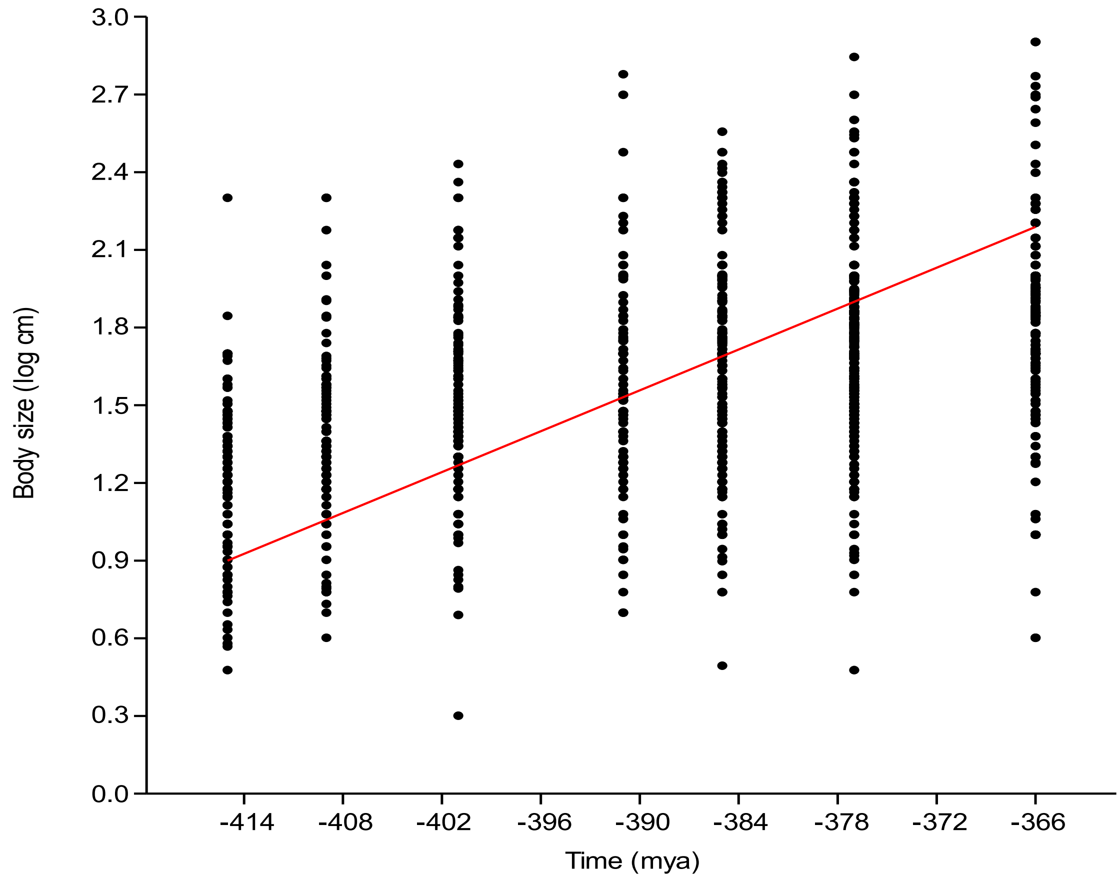

Fig. S5.
RMA regression: Devonian Log size/age (n=1006). See Table S5 for metrics.

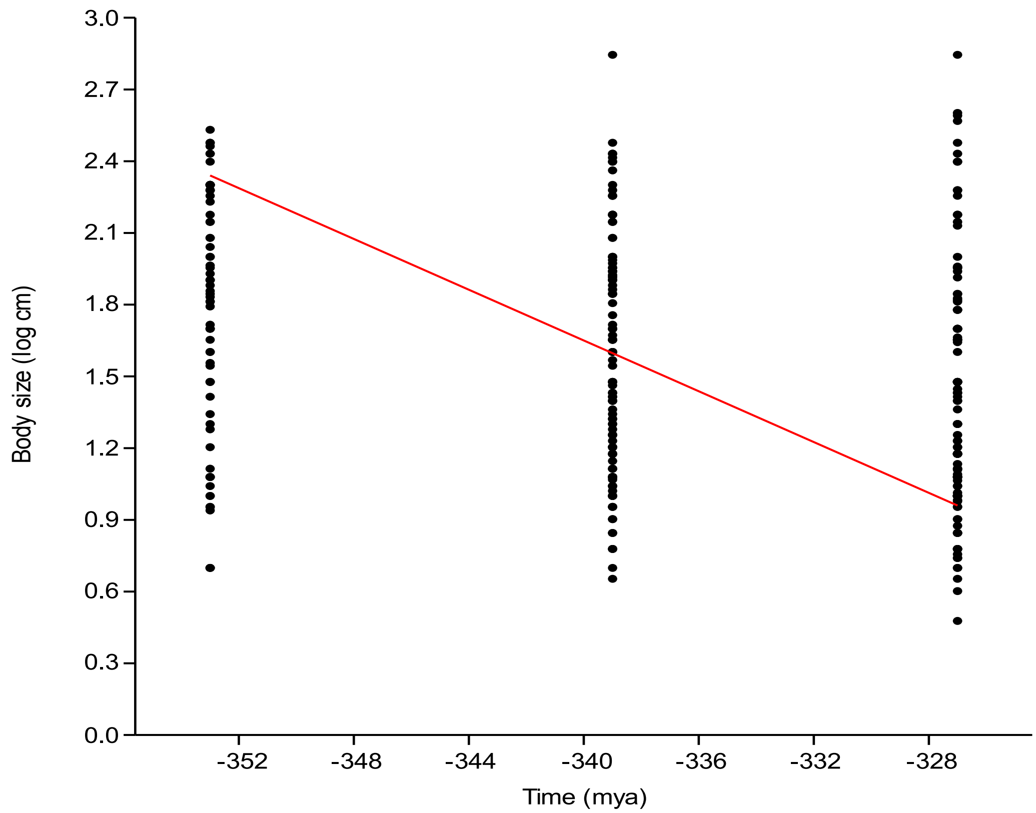

Fig. S6.
RMA regression: Mississippian Log size/age (n=318). See Table S5 for metrics.

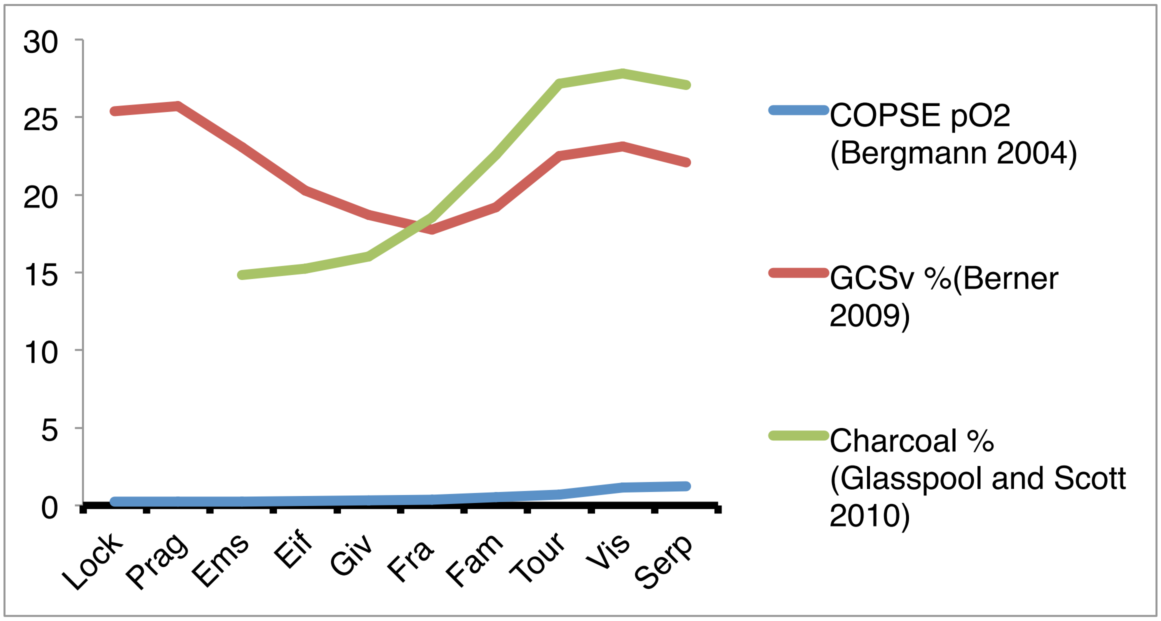

Fig. S7.
Oxygen estimate curves. See methods and Table S7 for details.

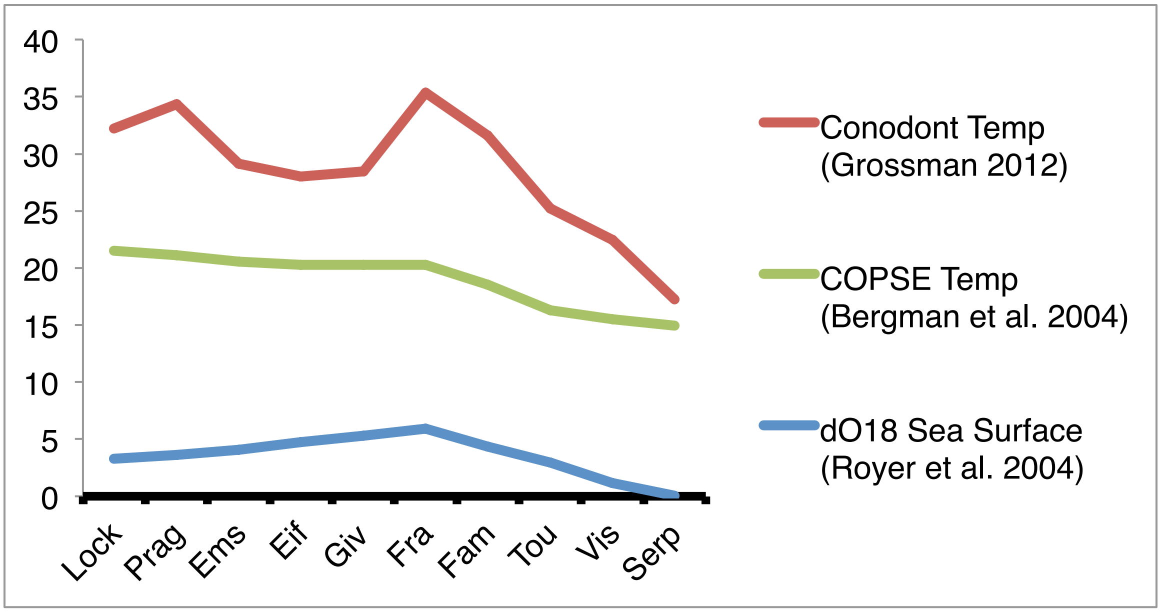

Fig. S8.

Temperature and proxy estimate curves. See methods and Table S9 for details.

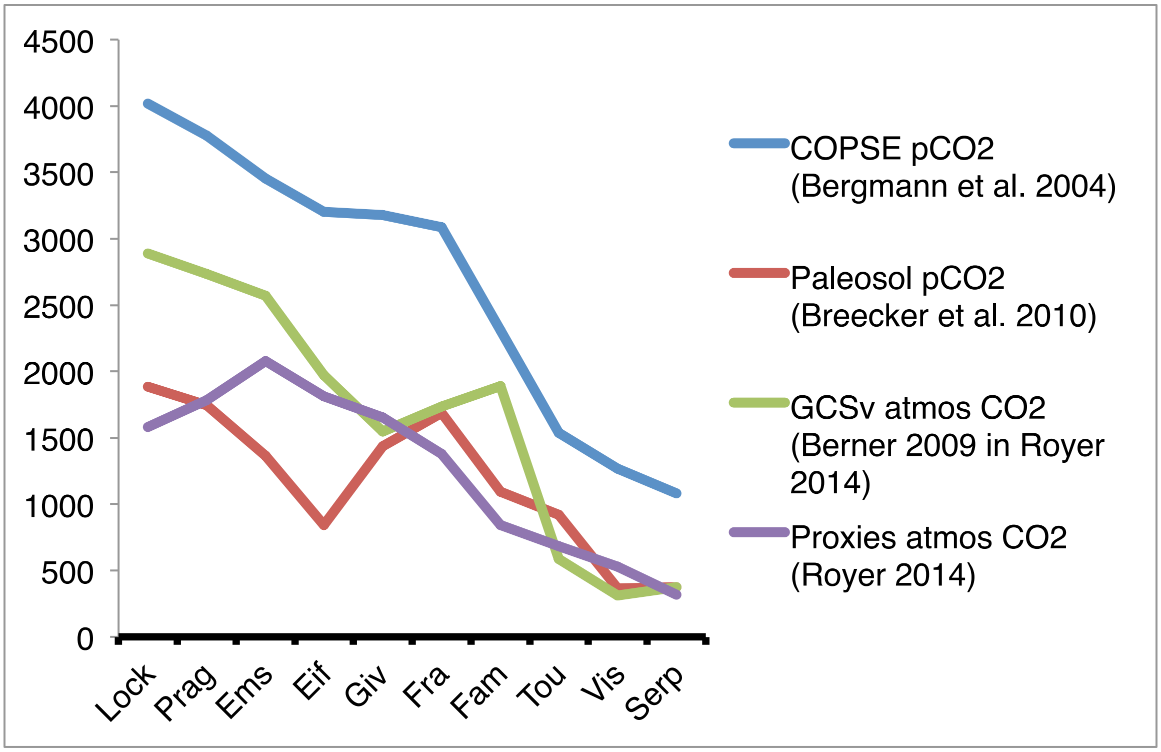

Fig. S9.
CO_2 estimate curves as proxies for temperature. See methods and Table S9 for details.

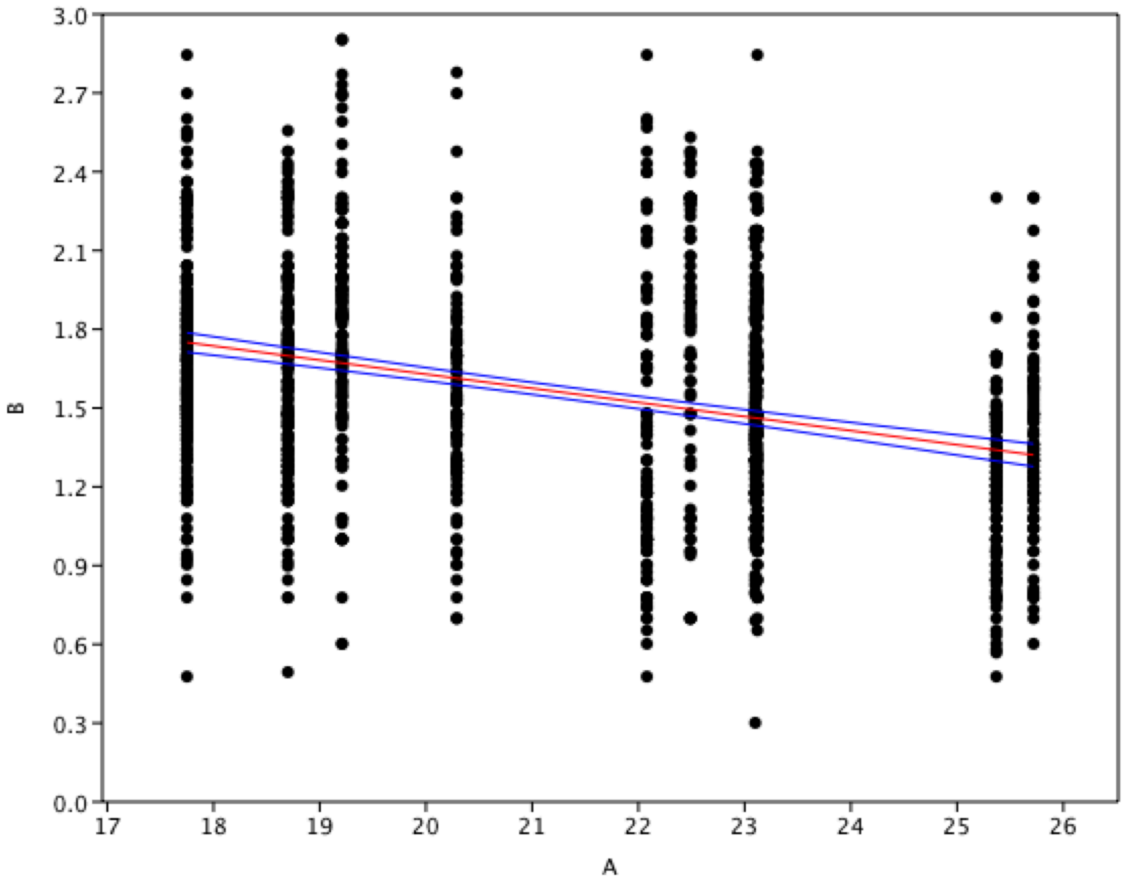

Fig. S10.

OLS regression: sizes and *GeoCarbSulfvolc* oxygen (*17*). See Table S8 for regression metrics.

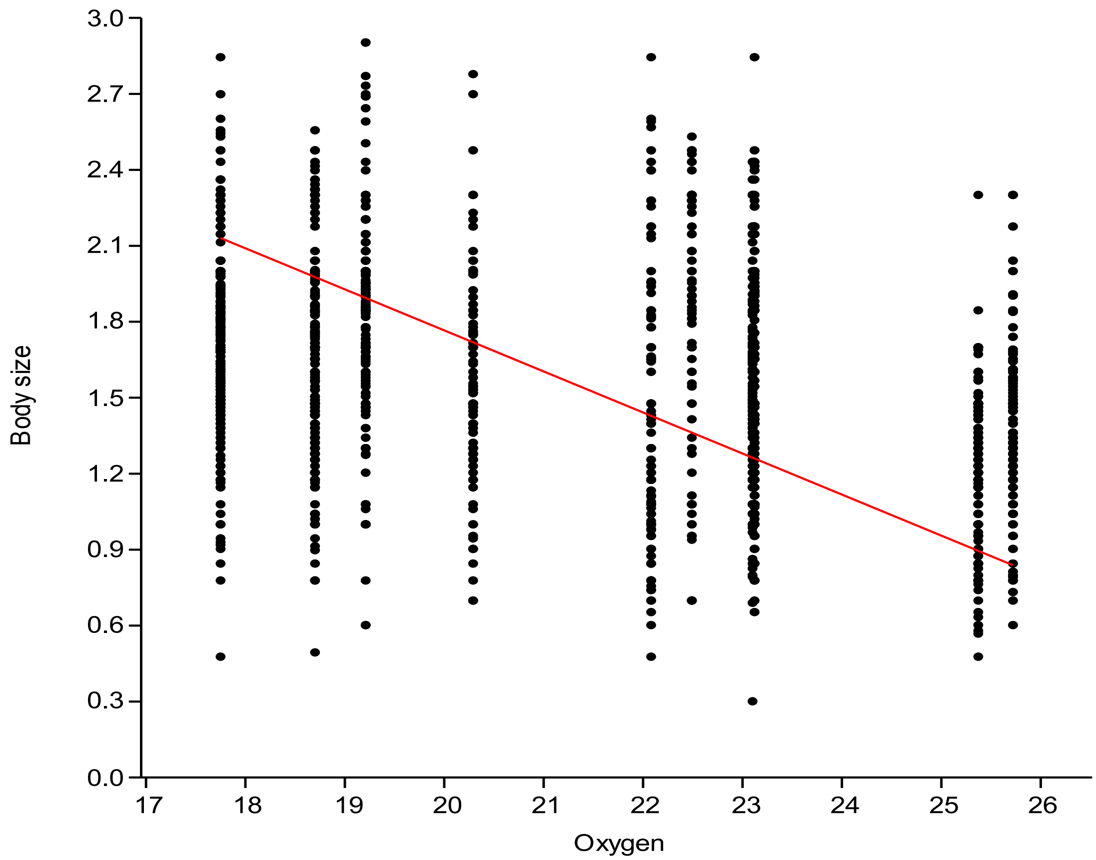

Fig. S11.
RMA regression: sizes and *GeoCarbSulfvolc* oxygen (*17*). See Table S9 for regression metrics.

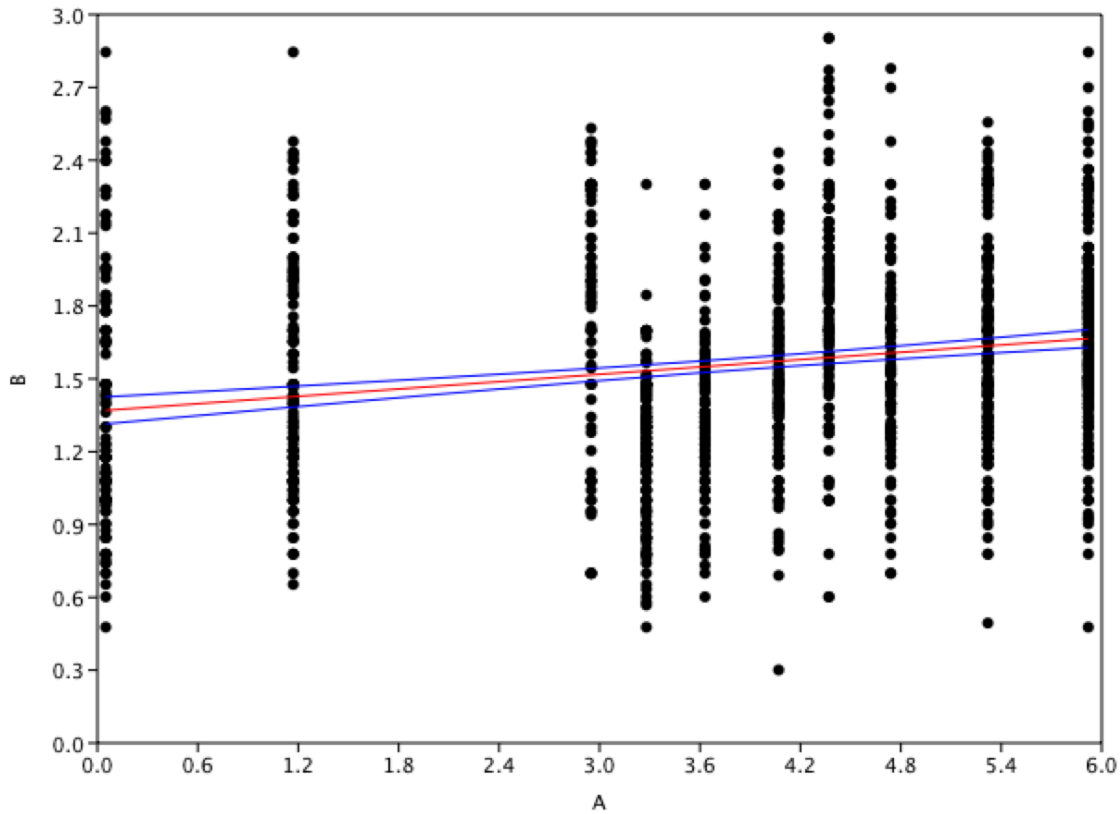

Fig. S12.
OLS regression: sizes and sea surface dO_{18} temperature proxy (*16*). See Table S11 for regression metrics.

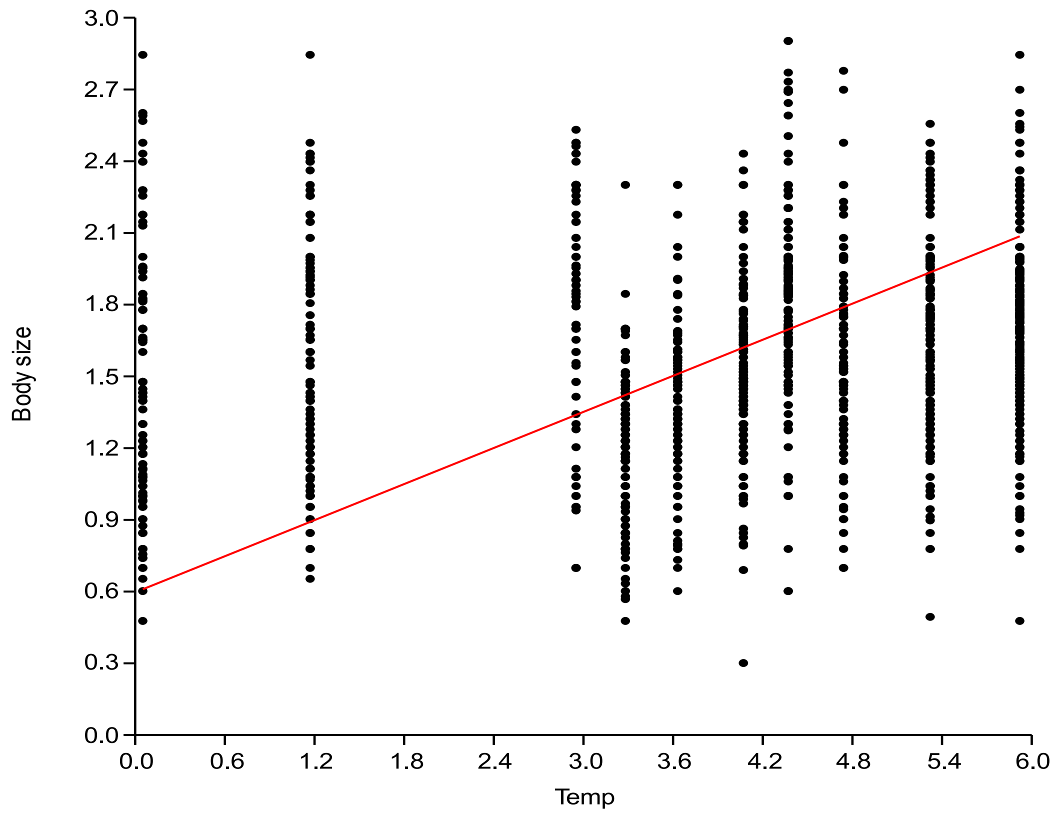

Fig. S13.
RMA regression: sizes and sea surface dO_{18} temperature proxy (*16*). See Table S12 for regression metrics.

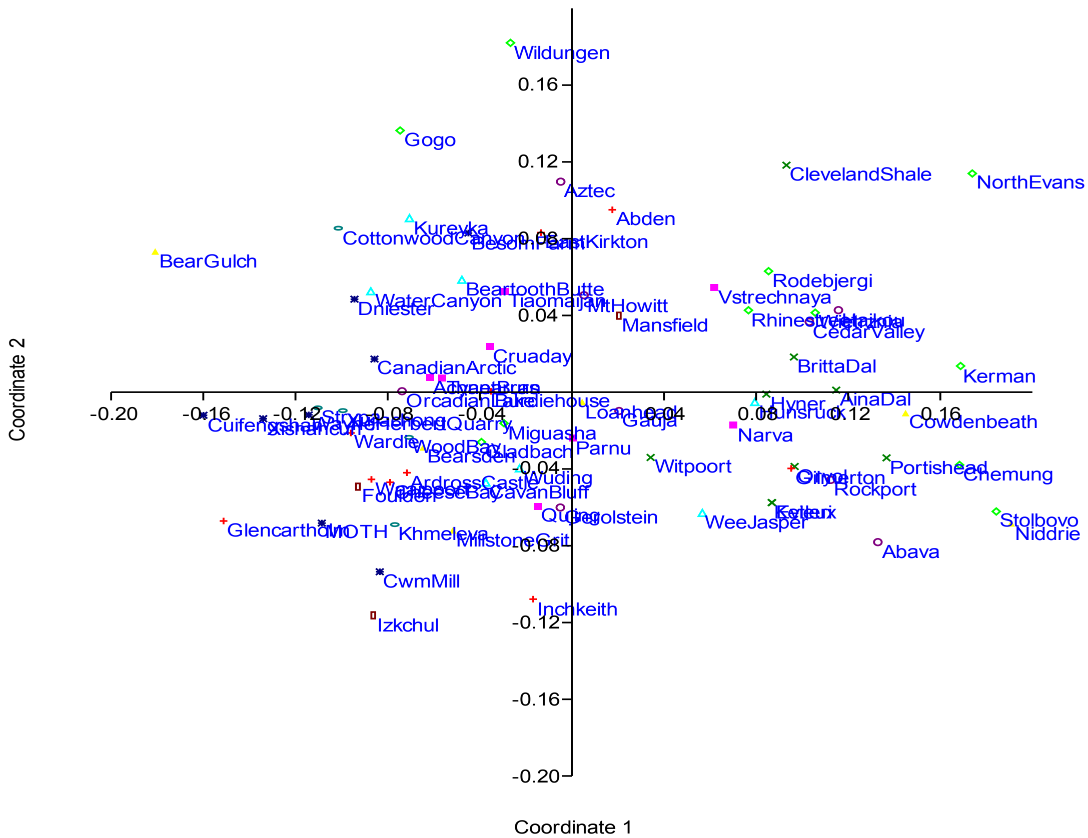

Fig. S14.

NMDS for Devonian-Mississippian faunas (Bray-Curtis distances). See Table S14 for faunal size composition and Table S17 for scores based on species counts within bins.

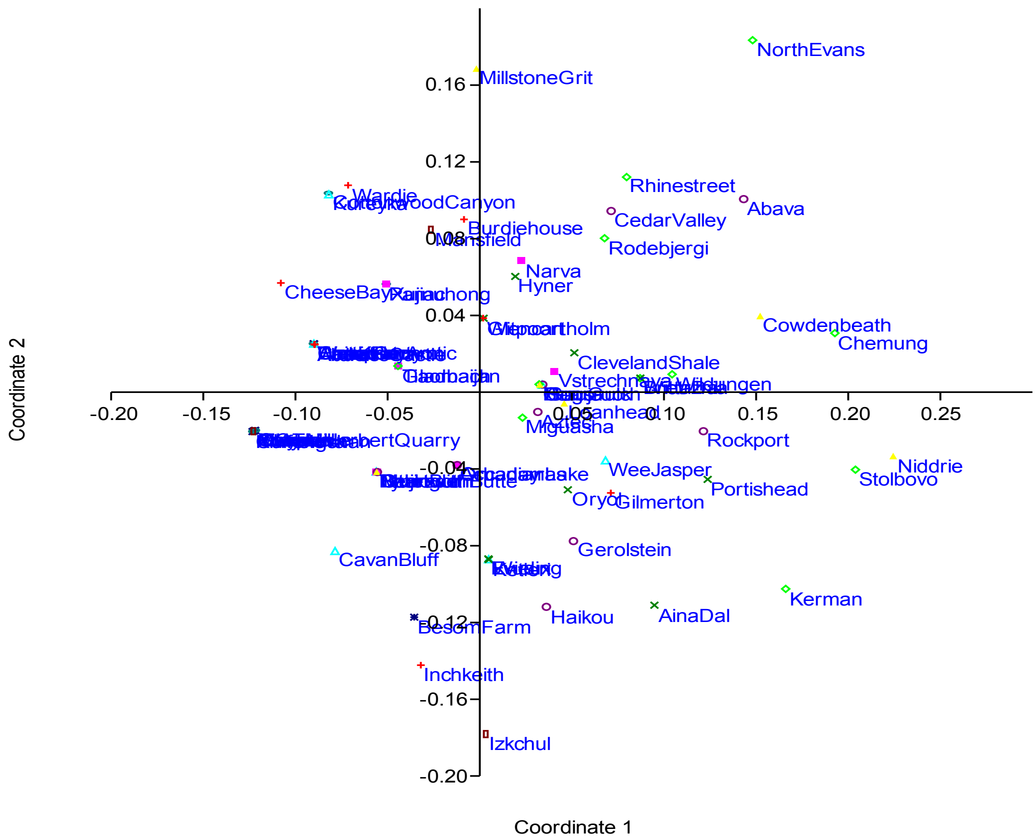

Fig. S15.

NMDS for Devonian-Mississippian faunas (Kulczynski distances). See Table S14 for size composition of faunas. See Table S18 for NMDS scores based on presence-absence of size classes.

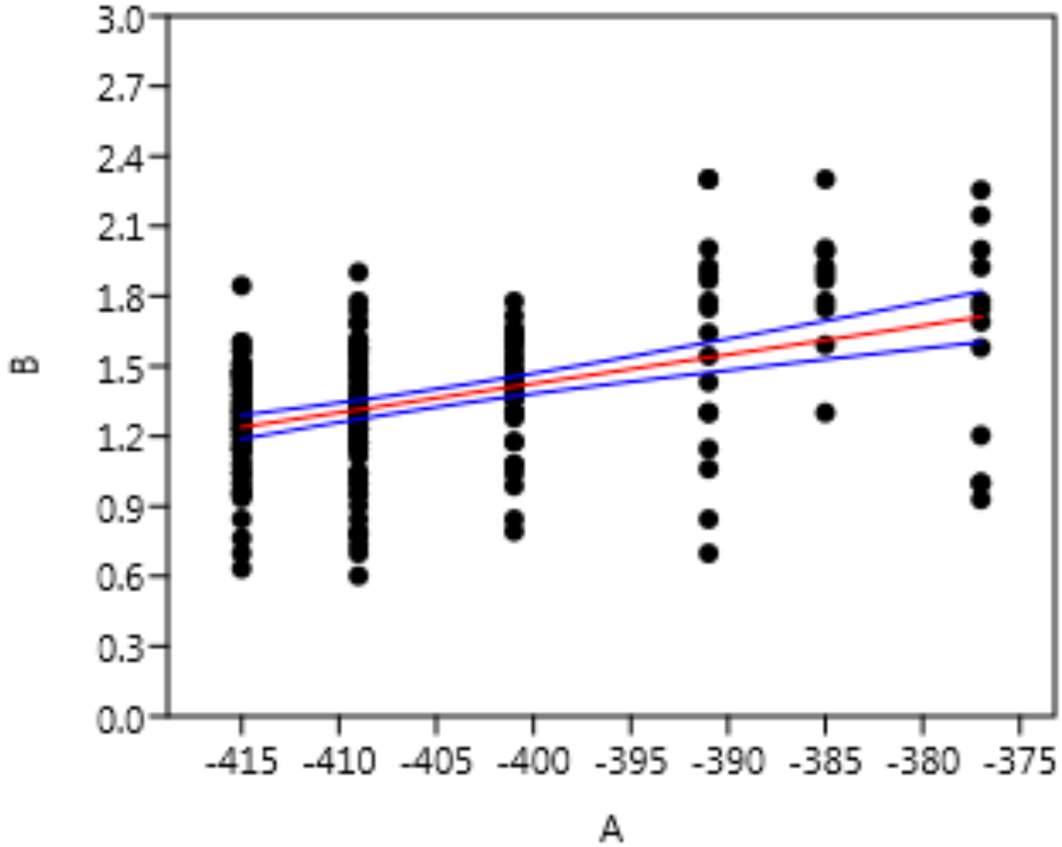

Fig. S16.
OLS regression: Devonian "Agnathan" size/age. See Table S19 for metrics.

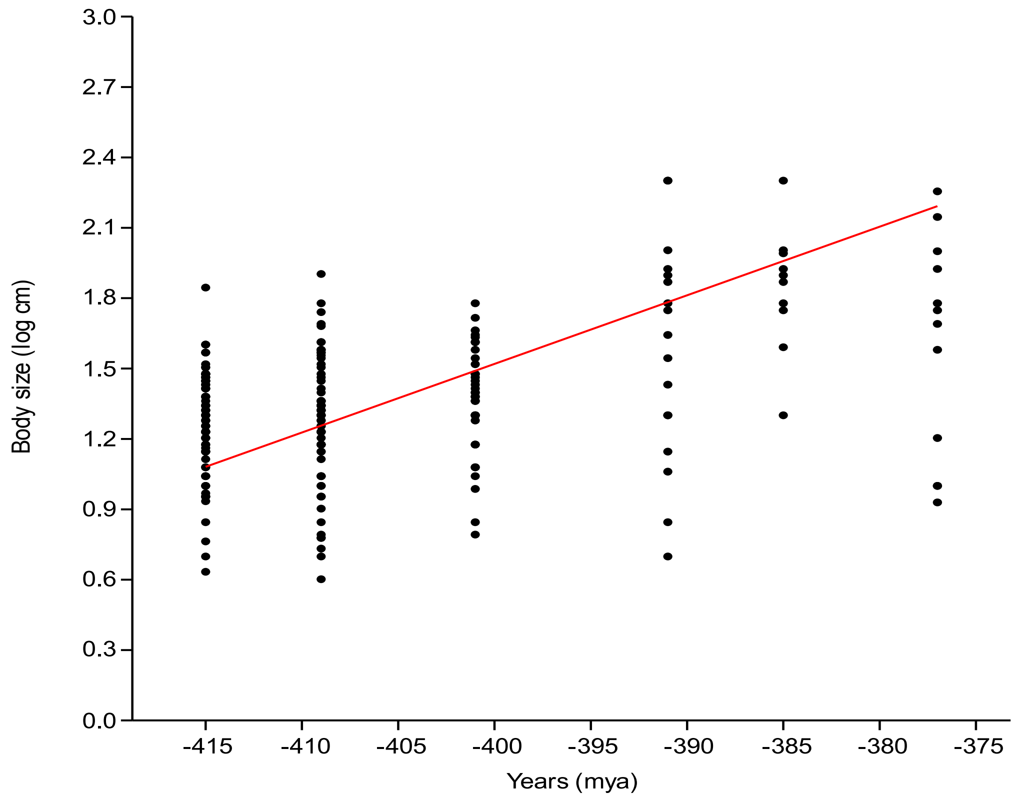

Fig. S17.

RMA regression: Devonian "Agnathan" size/age. See Table S20 for metrics.

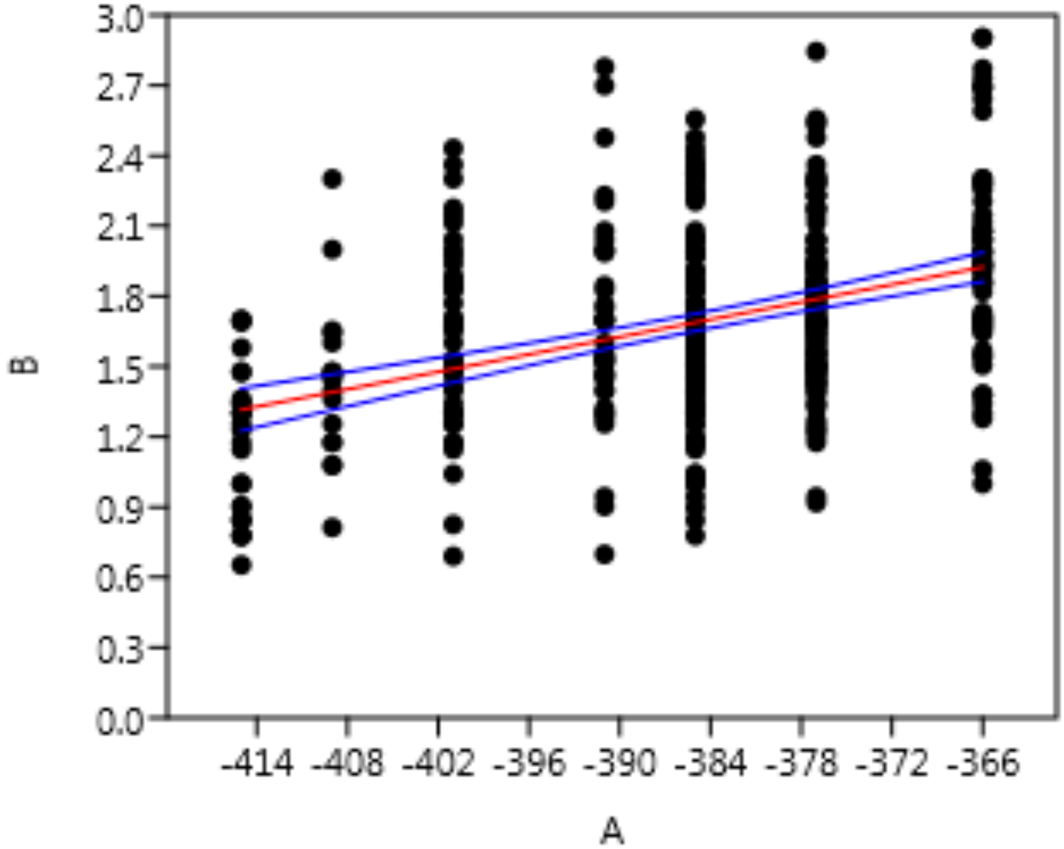

Fig. S18.
OLS regression: Devonian "Placoderm" size/age. See Table S19 for metrics.

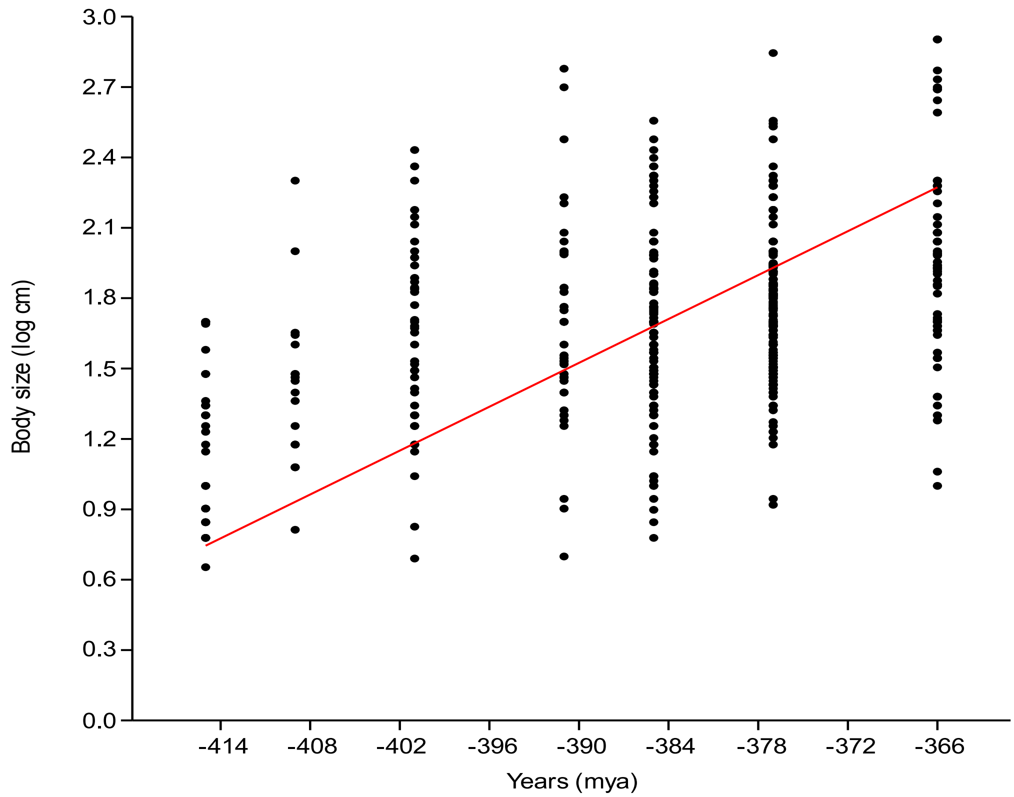

Fig. S19.
RMA regression: Devonian “Placoderm” size/age. See Table S20 for metrics.

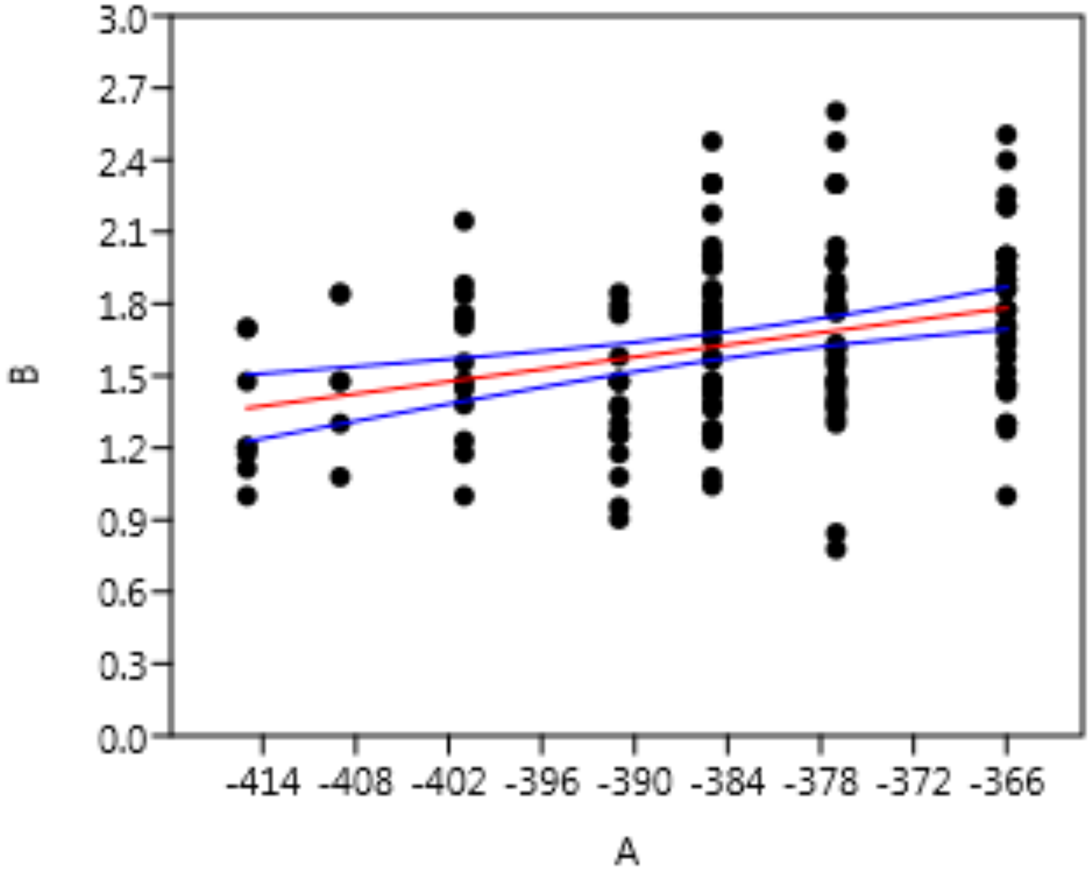

Fig. S20.
OLS regression: Devonian Sarcopterygii size/age. See Table S19 for metrics.

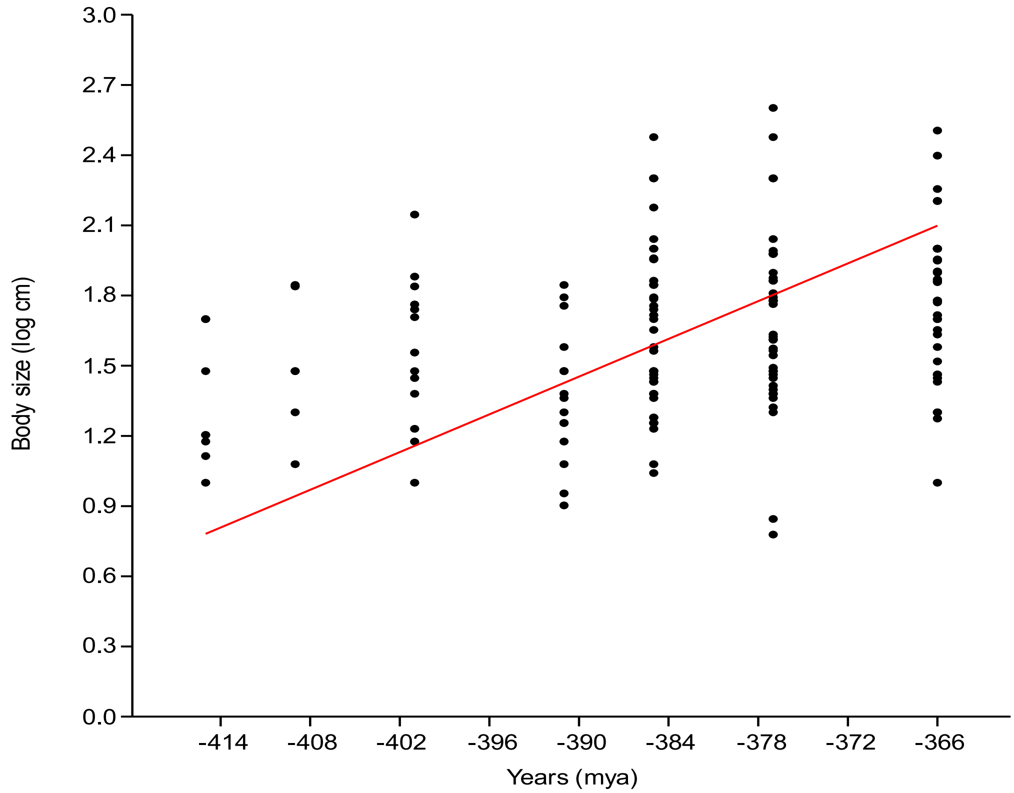

Fig. S21.
RMA regression: Devonian Sarcopterygii body size/age. See Table S20 for metrics.

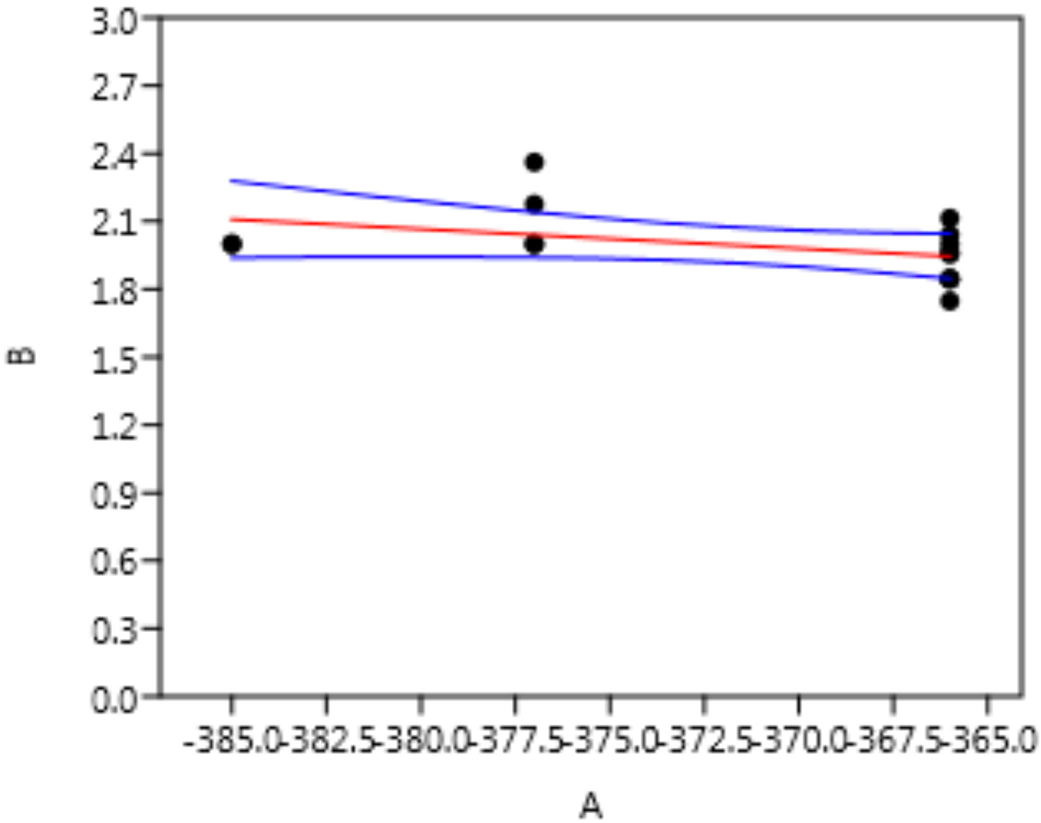

Fig. S22.

OLS regression: Devonian Tetrapoda size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (Table S19). The mean transformed body length for the Devonian was plotted in Fig. 1B.

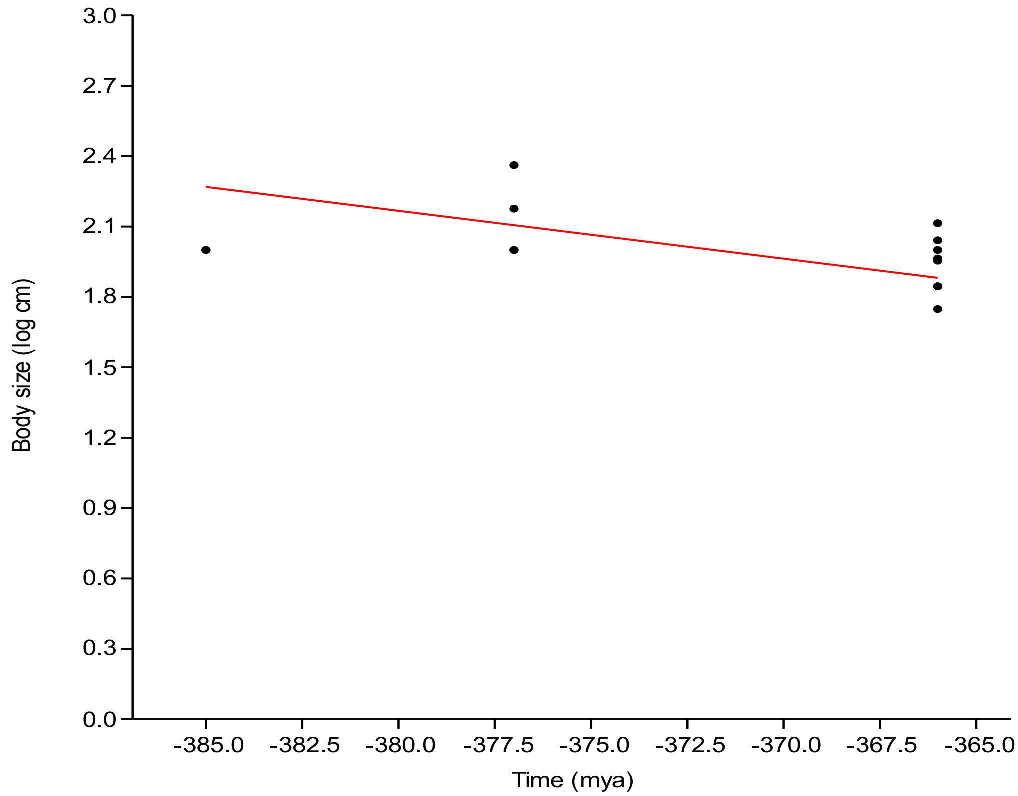

Fig. S23.

RMA regression: Devonian Tetrapoda size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (Table S20). The mean transformed body length for the Devonian was plotted in Fig. S4B.

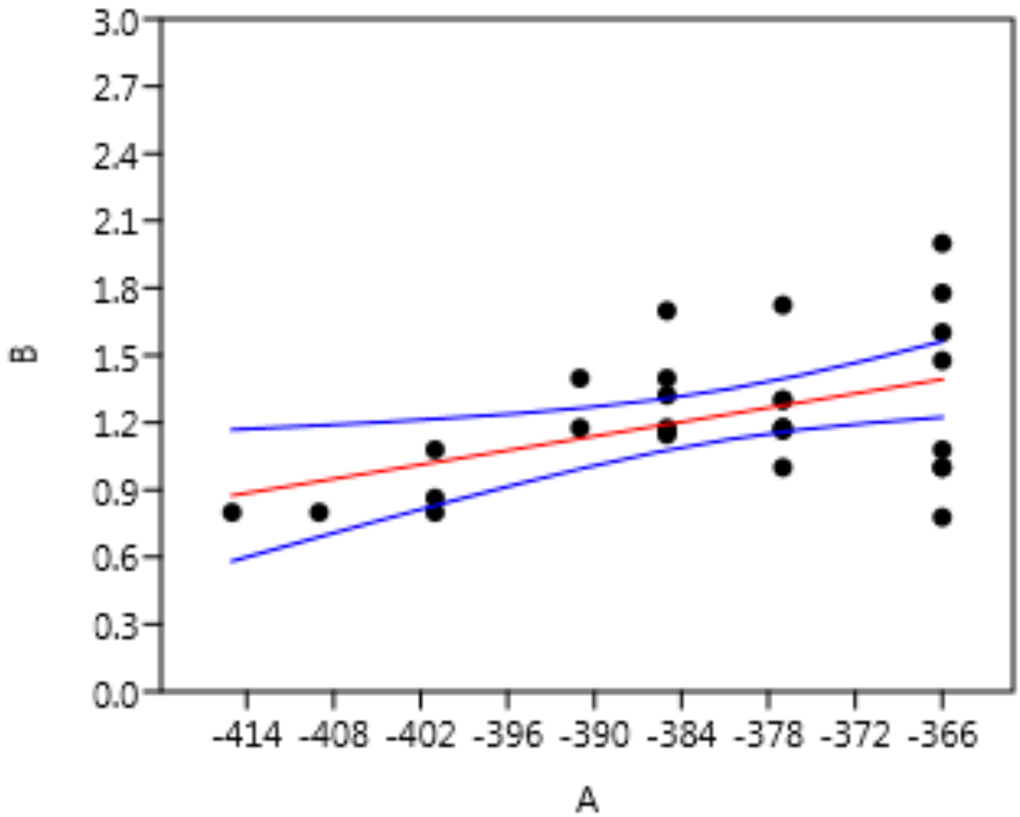

Fig. S24.
OLS regression: Devonian Actinopterygii size/age. See Table S19 for metrics.

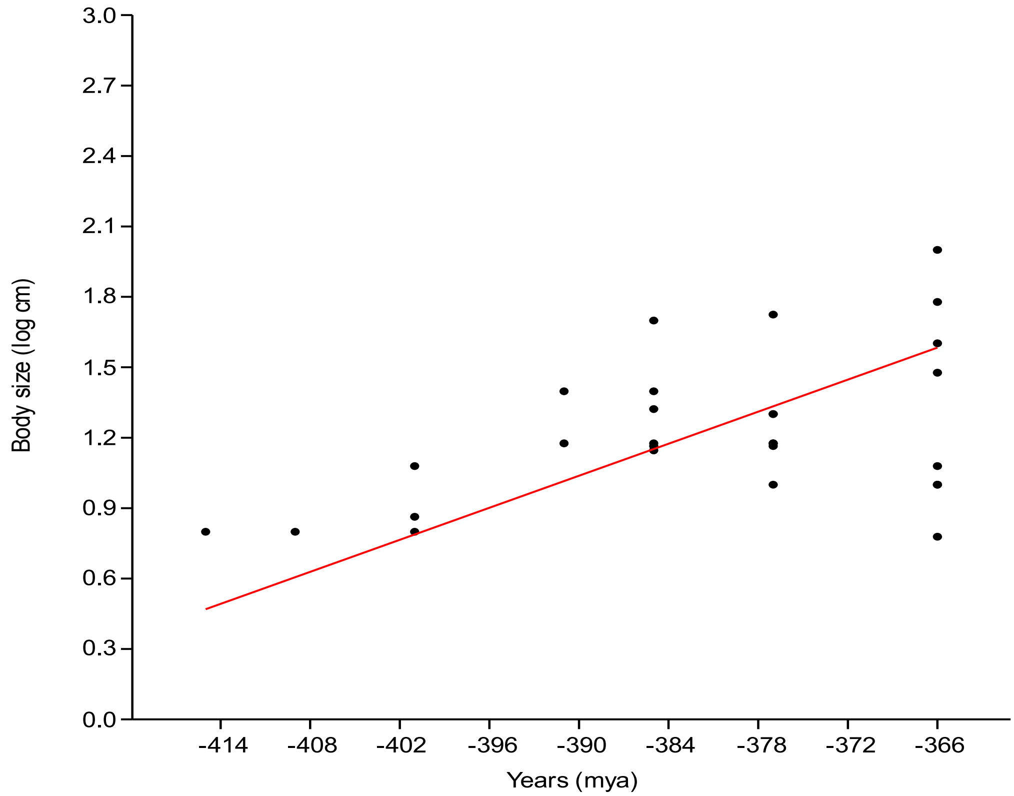

Fig. S25.
RMA regression: Devonian Actinopterygii size/age. See Table S20 for metrics.

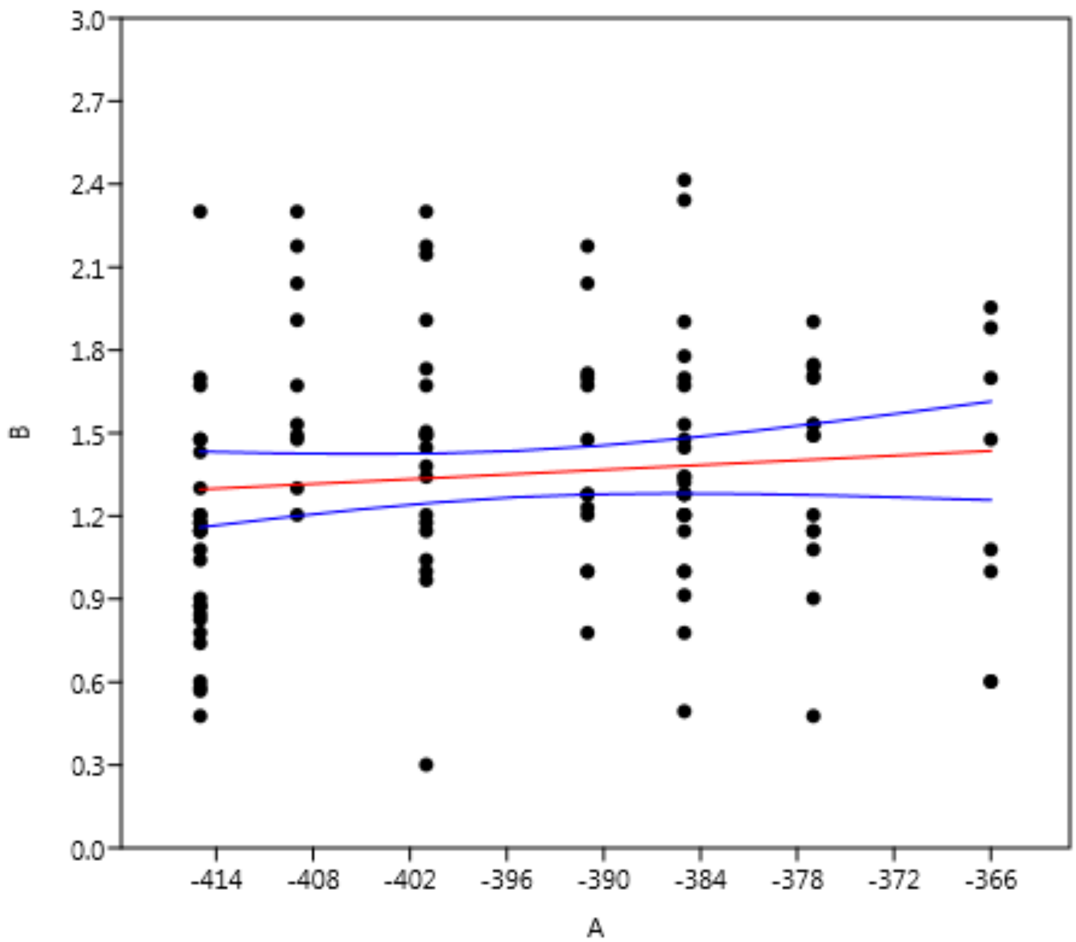

Fig. S26.

OLS regression: Devonian "Acanthodian" size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S19 for metrics). Therefore, the mean transformed body length for the Devonian was plotted in Fig. 1B.

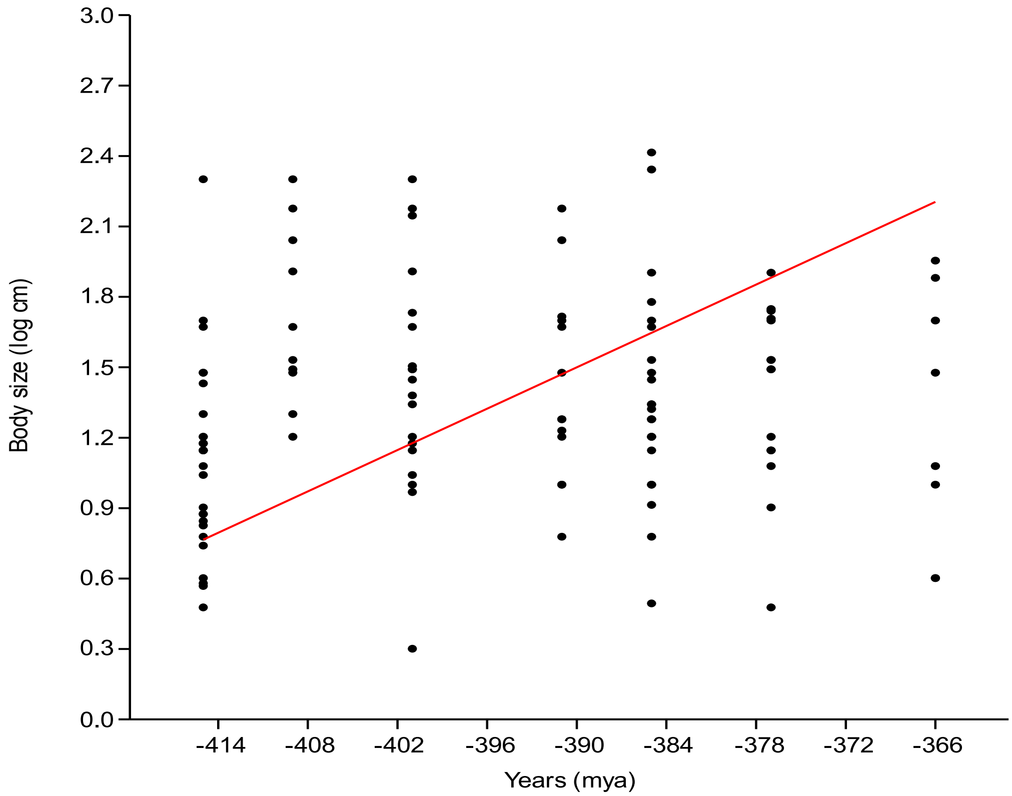

Fig. S27.

RMA regression: Devonian “Acanthodian” size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S20 for metrics). Therefore, the mean transformed body length for the Devonian was plotted in Fig. S4B.

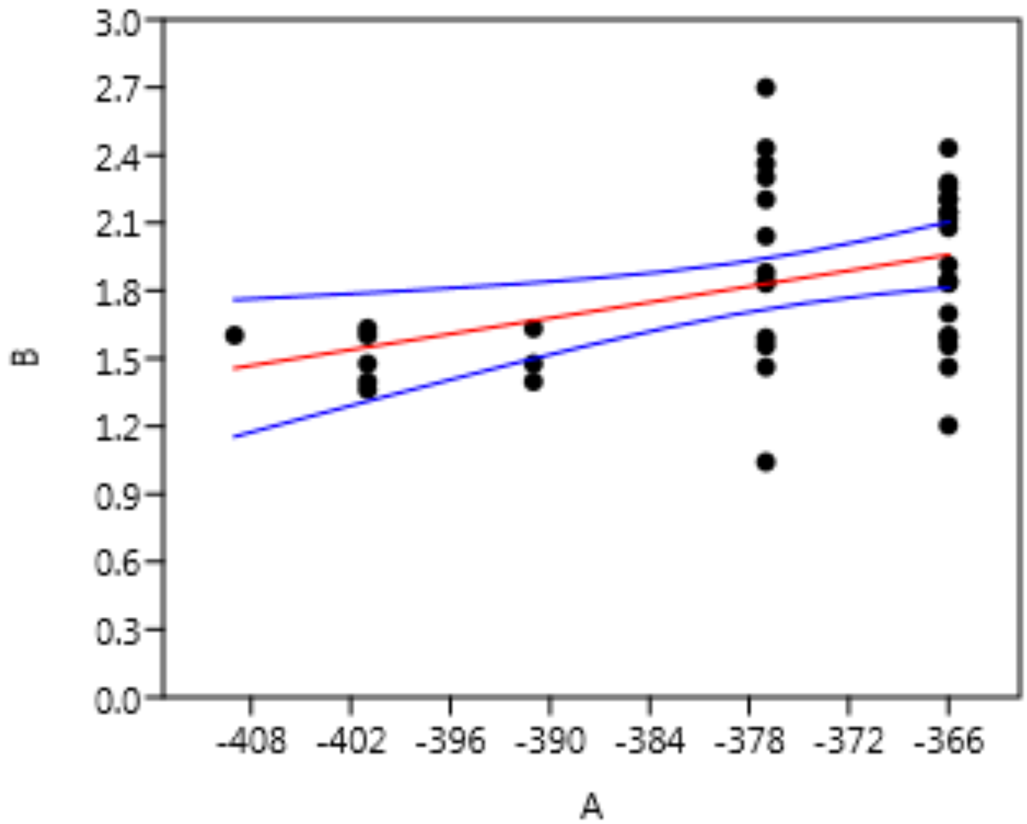

Fig. S28.
OLS regression: Devonian Chondrichthyes size/age. See Table S19 for metrics.

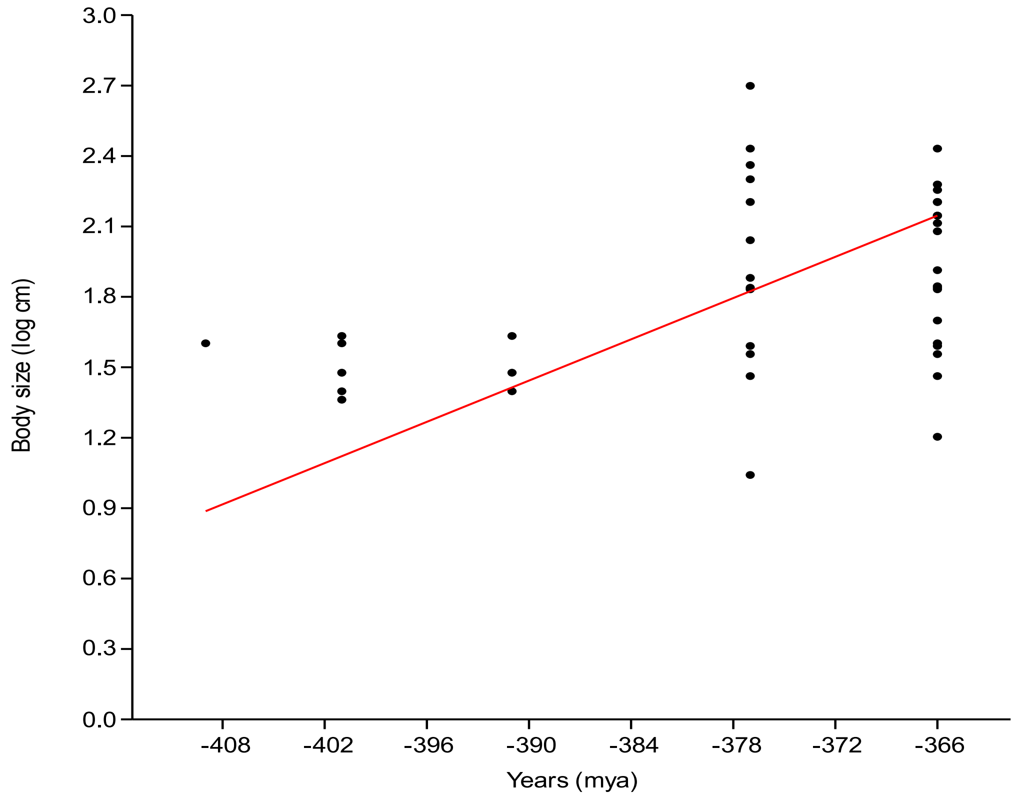

Fig. S29.

RMA regression: Devonian Chondrichthyes size/age. See Table S20 for metrics.

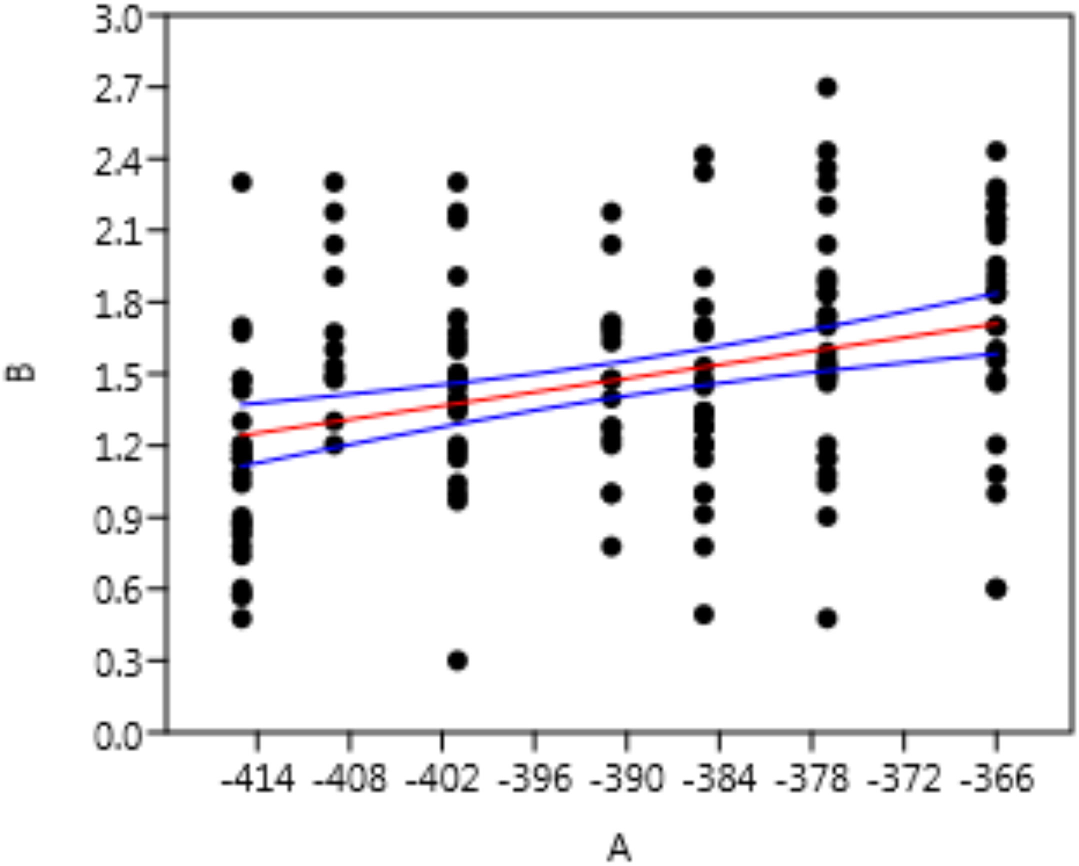

Fig. S30.
OLS regression: Devonian Acanthodian-Chondrichthyes size/age. See Table S19 for metrics.

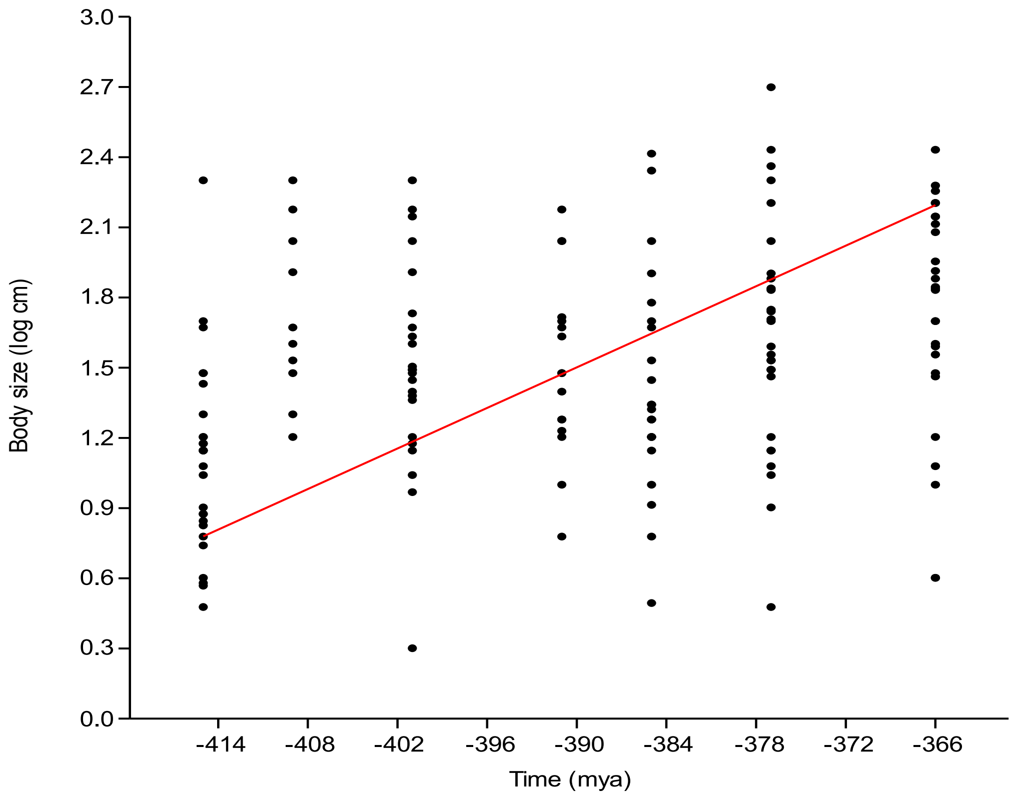

Fig. S31.

RMA regression: Devonian Acanthodian-Chondrichthyes size/age. See Table S20 for metrics.

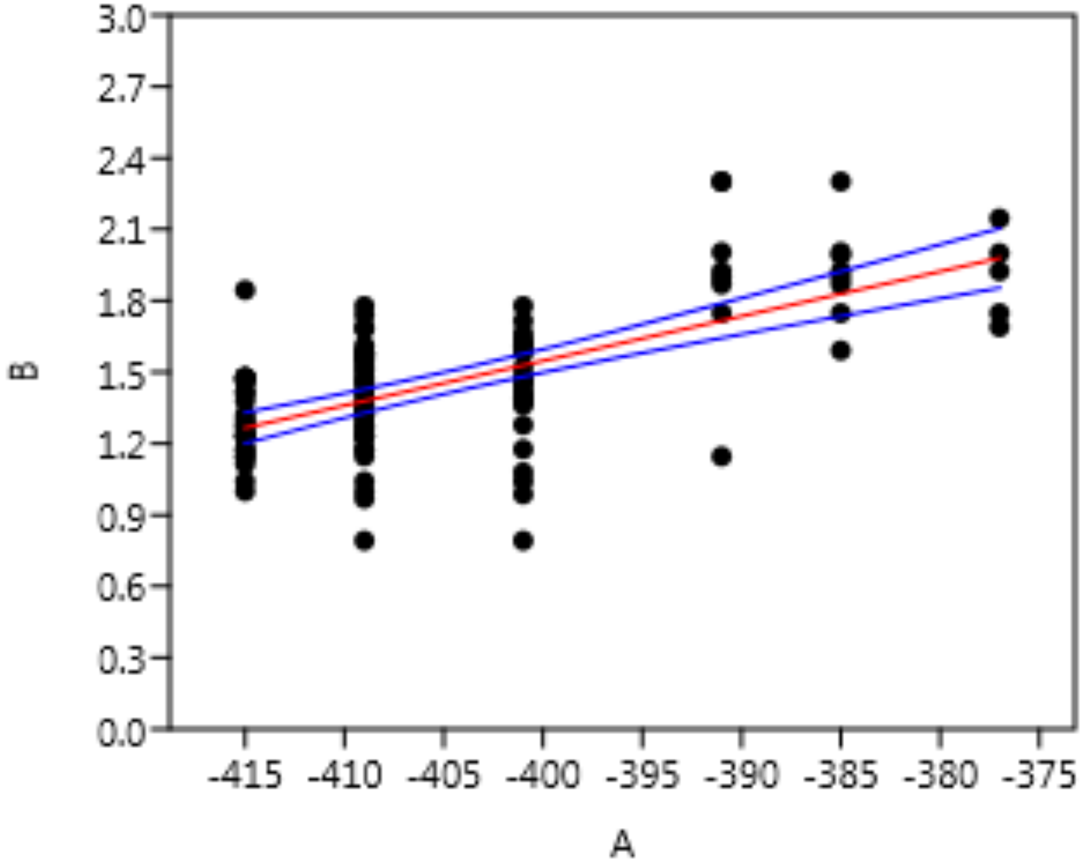

Fig. S32.
OLS regression: Devonian Heterostraci (“Agnatha”) size/age. See Table S23 for metrics.

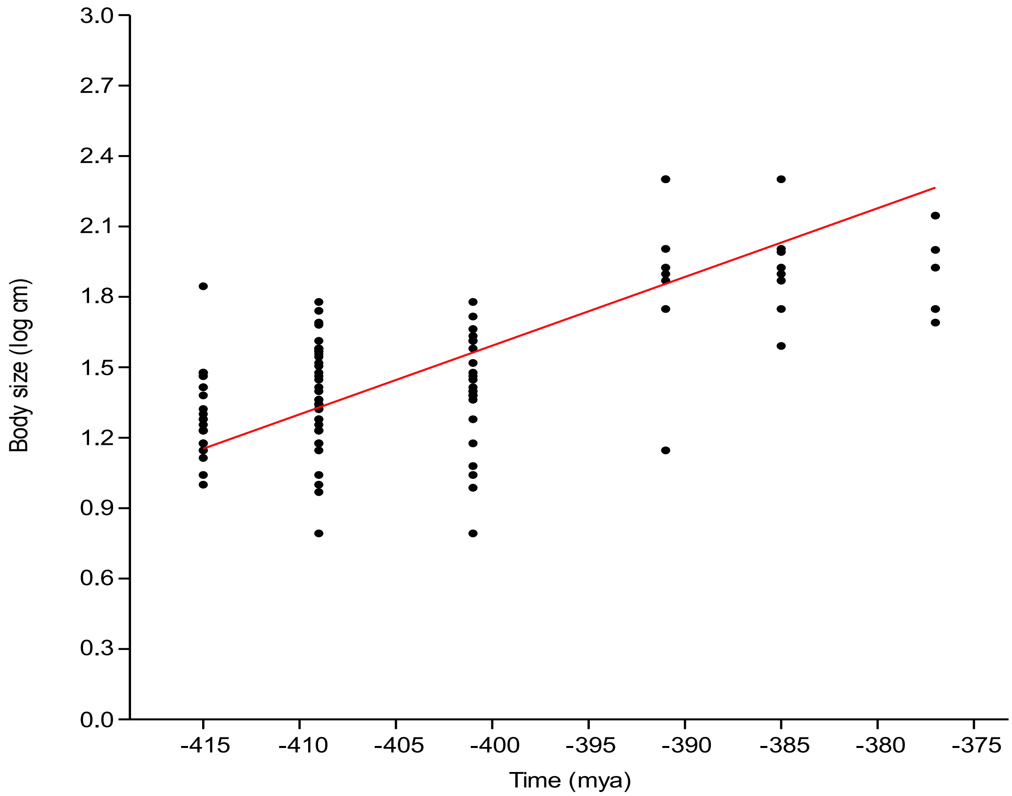

Fig. S33.
RMA regression: Devonian Heterostraci ("Agnatha") size/age. See Table S24 for metrics.

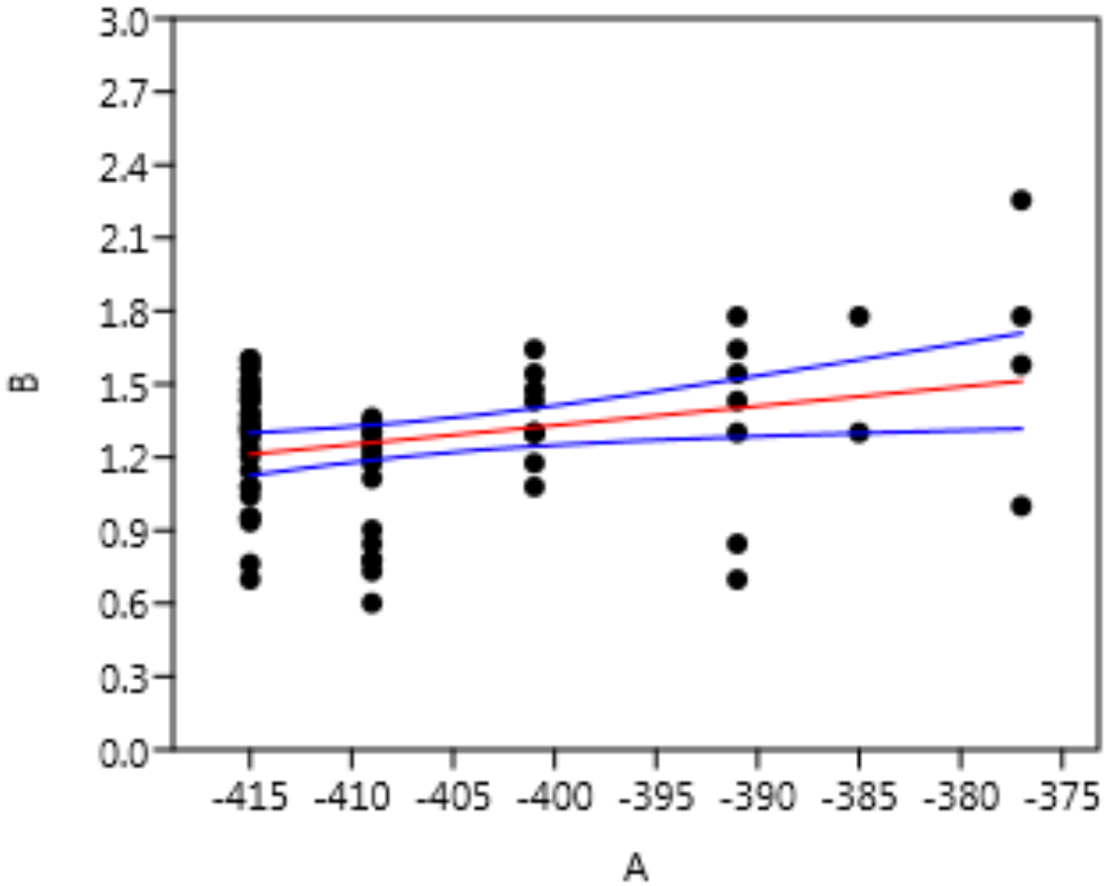

Fig. S34.
OLS regression: Devonian Osteostraci ("Agnatha") size/age. See Table S23 for metrics.

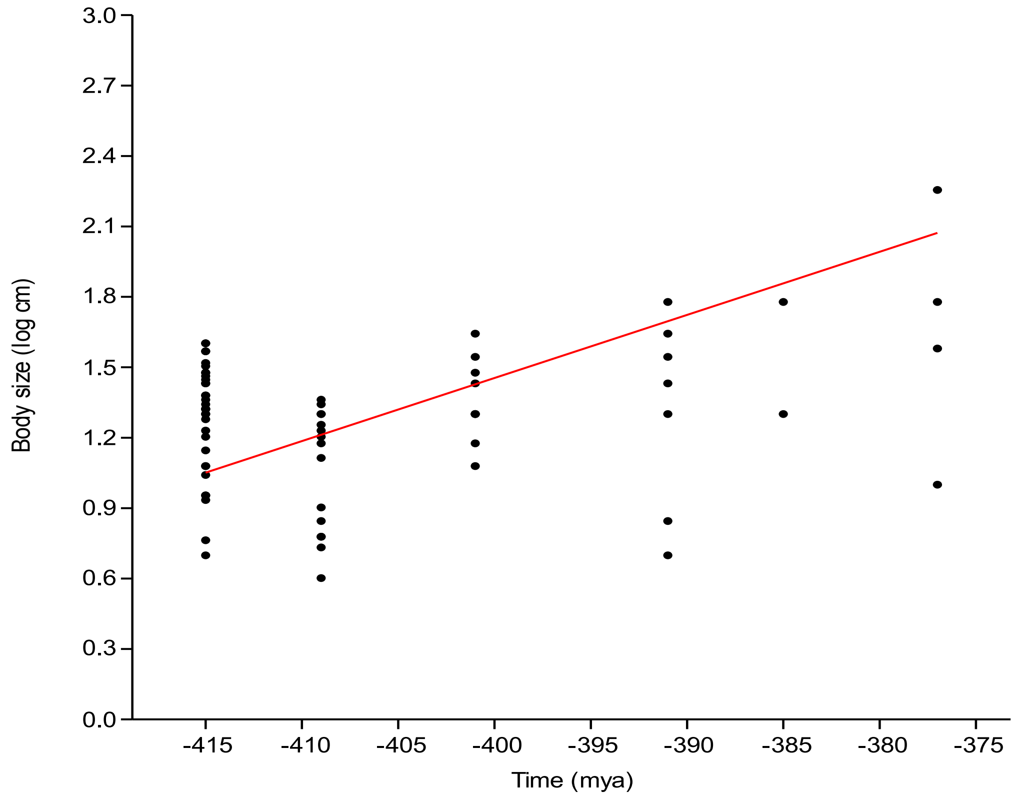

Fig. S35.
RMA regression: Devonian Osteostraci ("Agnatha") size/age. See Table S24 for metrics.

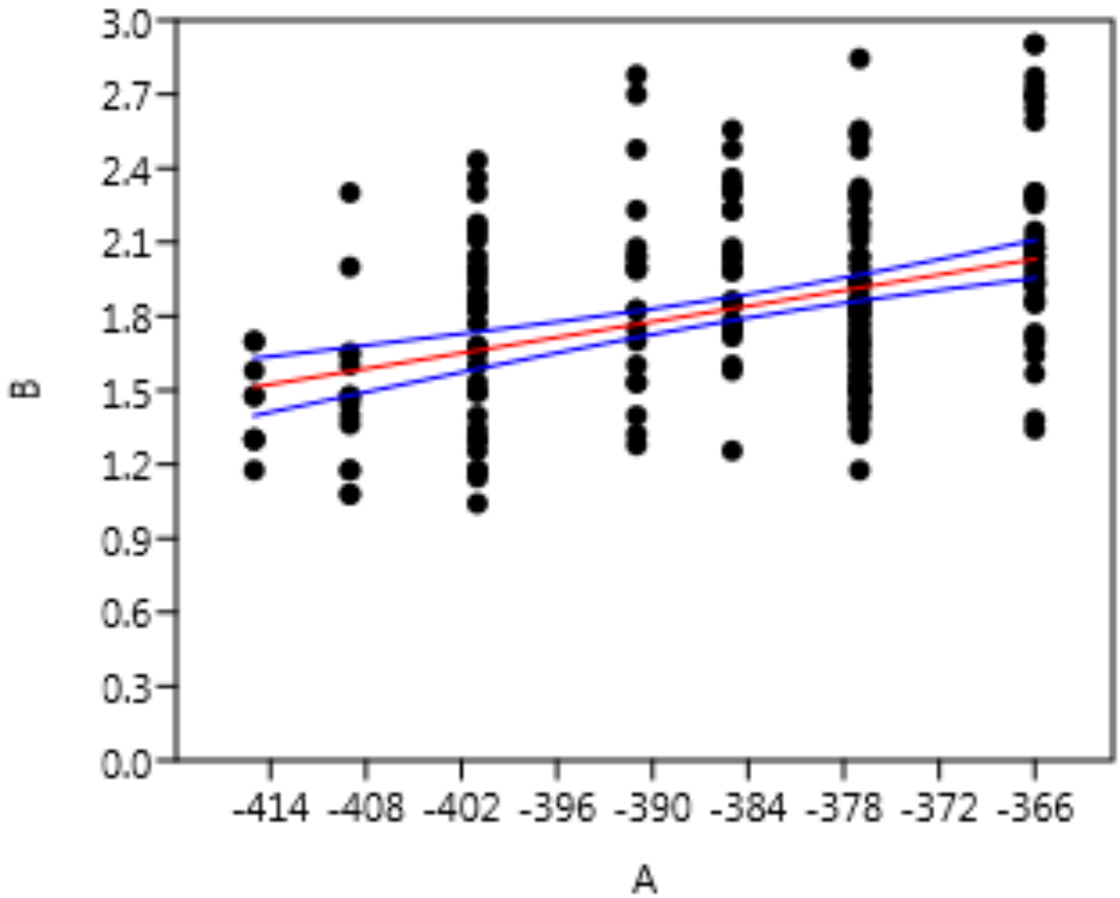

Fig. S36.
OLS regression: Devonian Arthrodira ("Placoderms") size/age. See Table S25 for metrics.

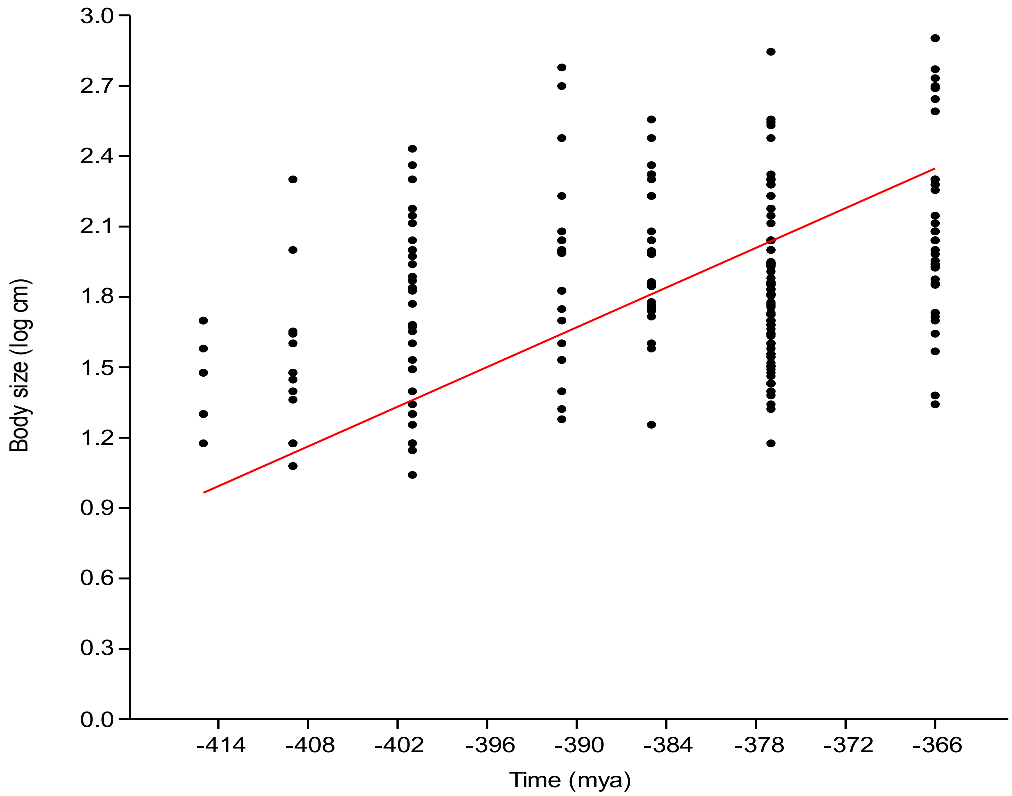

Fig. S37.
RMA regression: Devonian Arthrodira ("Placoderms") size/age. See Table S26 for metrics.

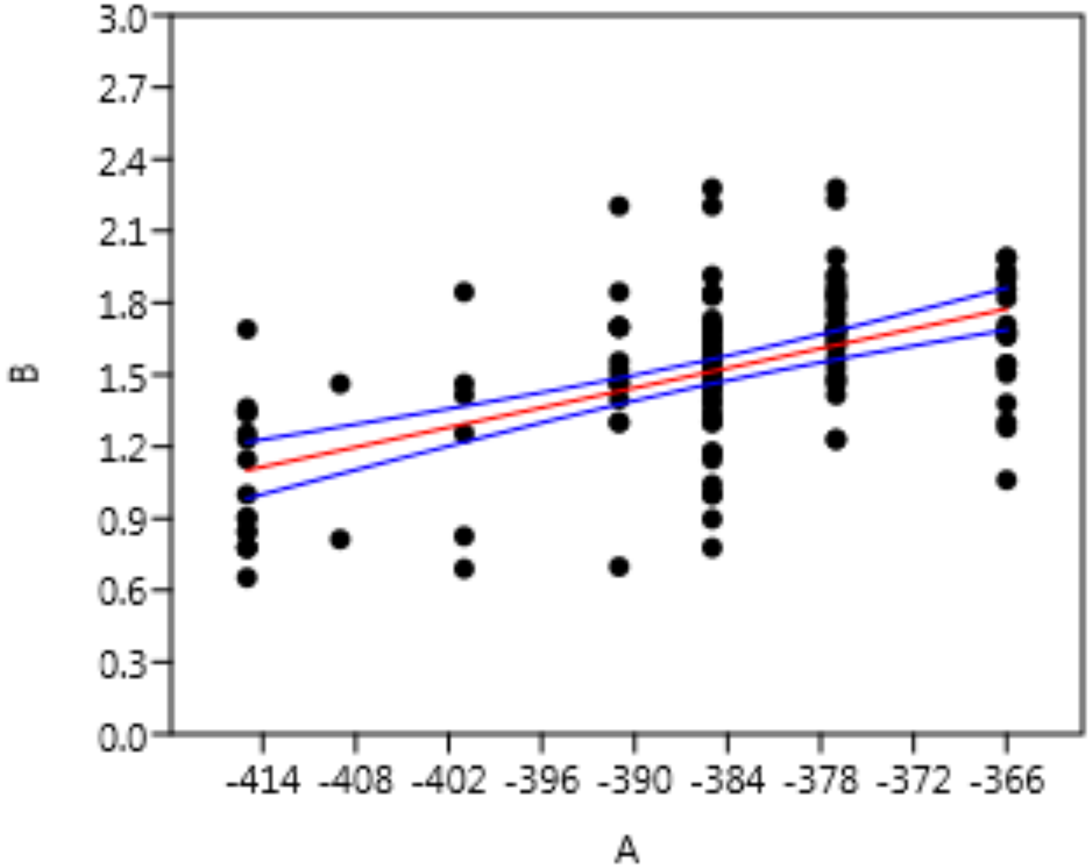

Fig. S38.
OLS regression: Devonian Antiarchi (“Placoderms”) size/age. See Table S25 for metrics.

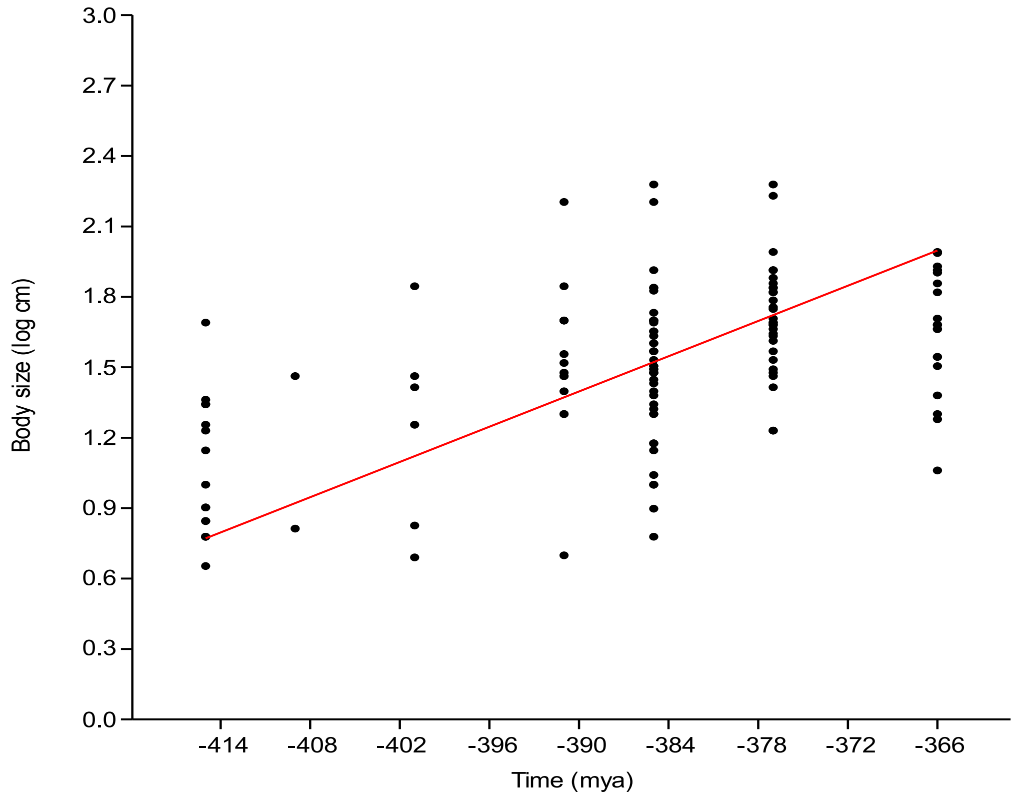

Fig. S39.

RMA regression: Devonian Antiarchi ("Placoderms") size/age. See Table S26 for metrics.

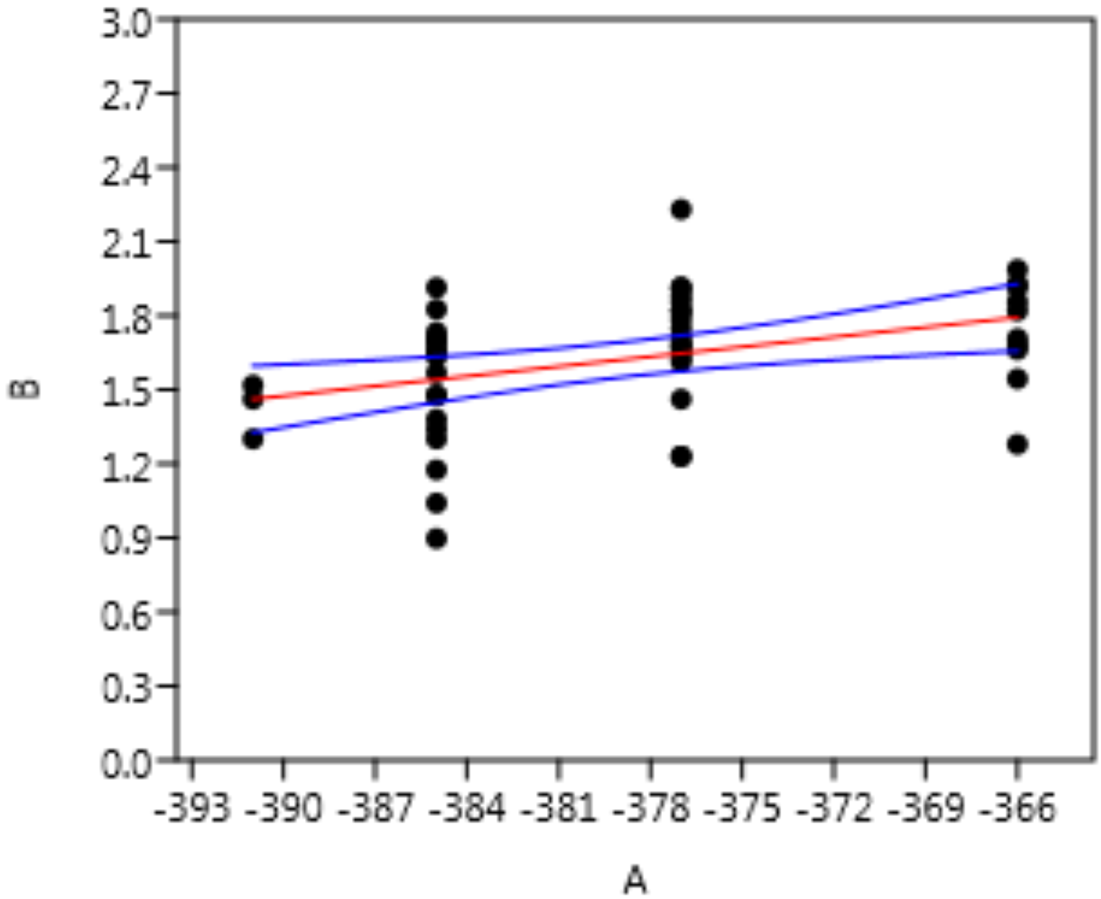

Fig. S40.

OLS regression: Devonian *Bothriolepis* (Antiarchi: “Placoderms”) size/age. See Table S25 for metrics.

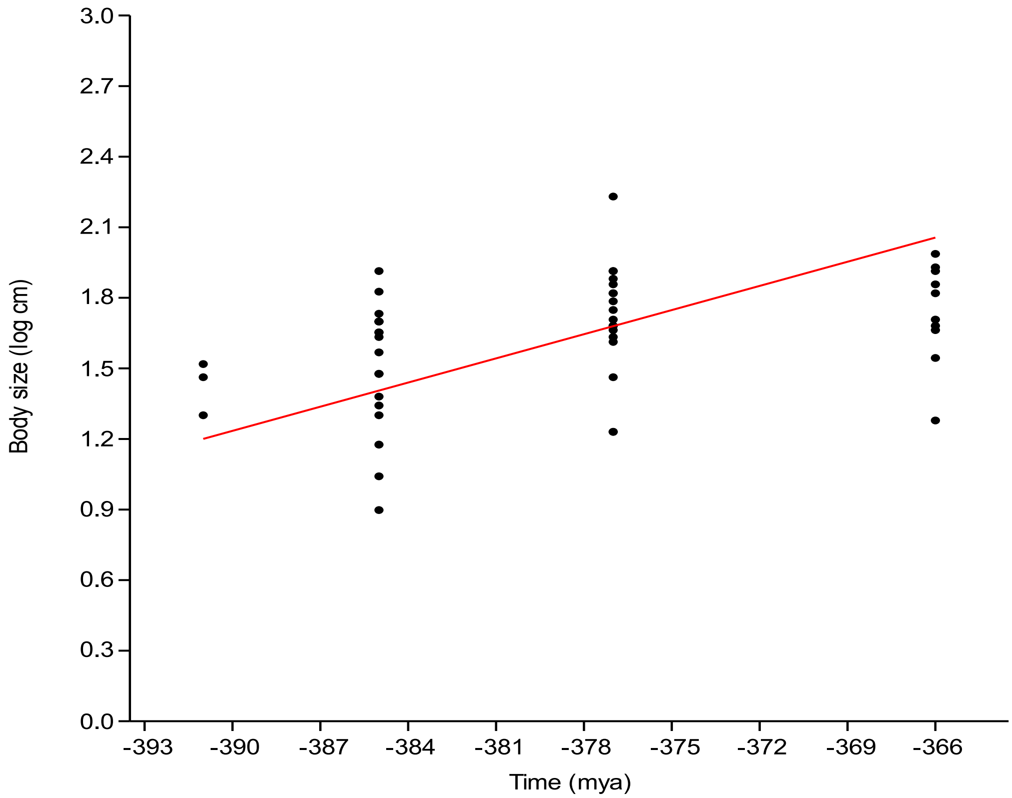

Fig. S41.

RMA regression: Devonian *Bothriolepis* (Antiarchi: “Placoderms”) size/age. See Table S26 for metrics.

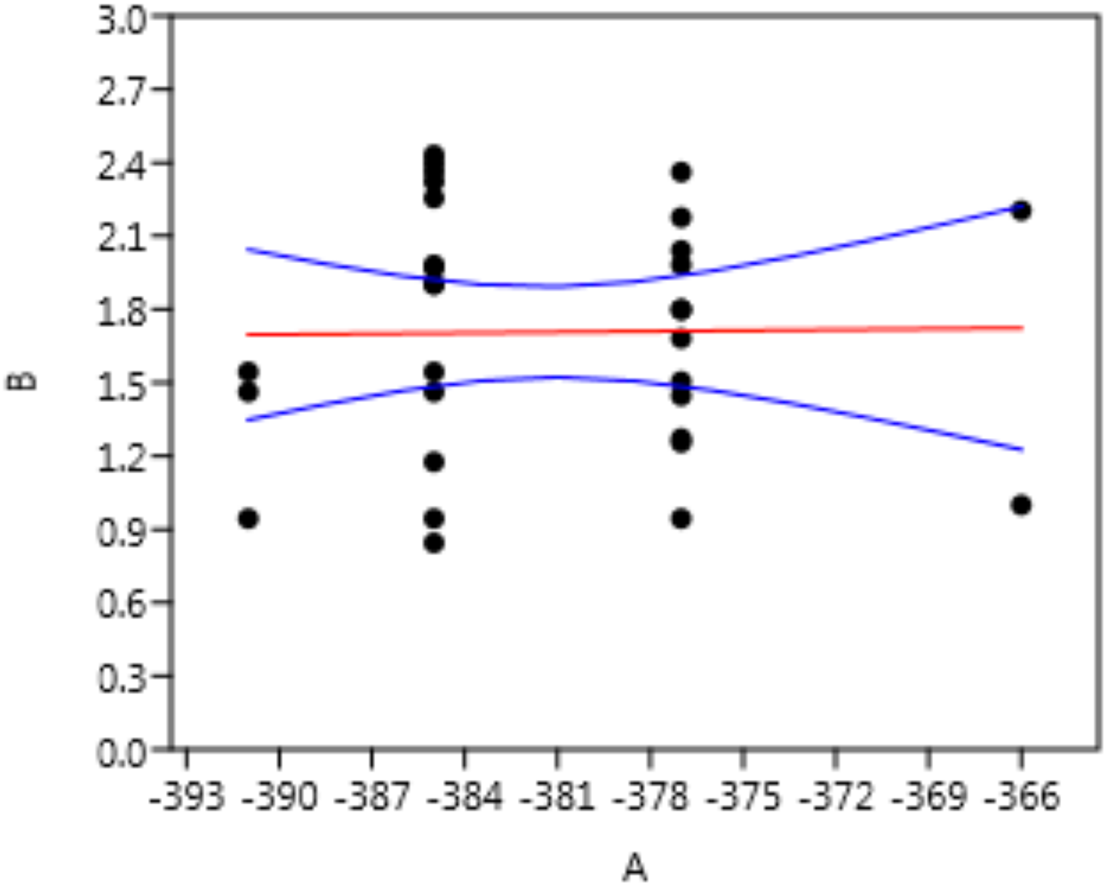

Fig. S42.

OLS regression: Devonian Ptyctodontida ("Placoderms") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S25 for metrics). Therefore, the mean transformed body length for the Devonian was plotted in Fig. 1C.

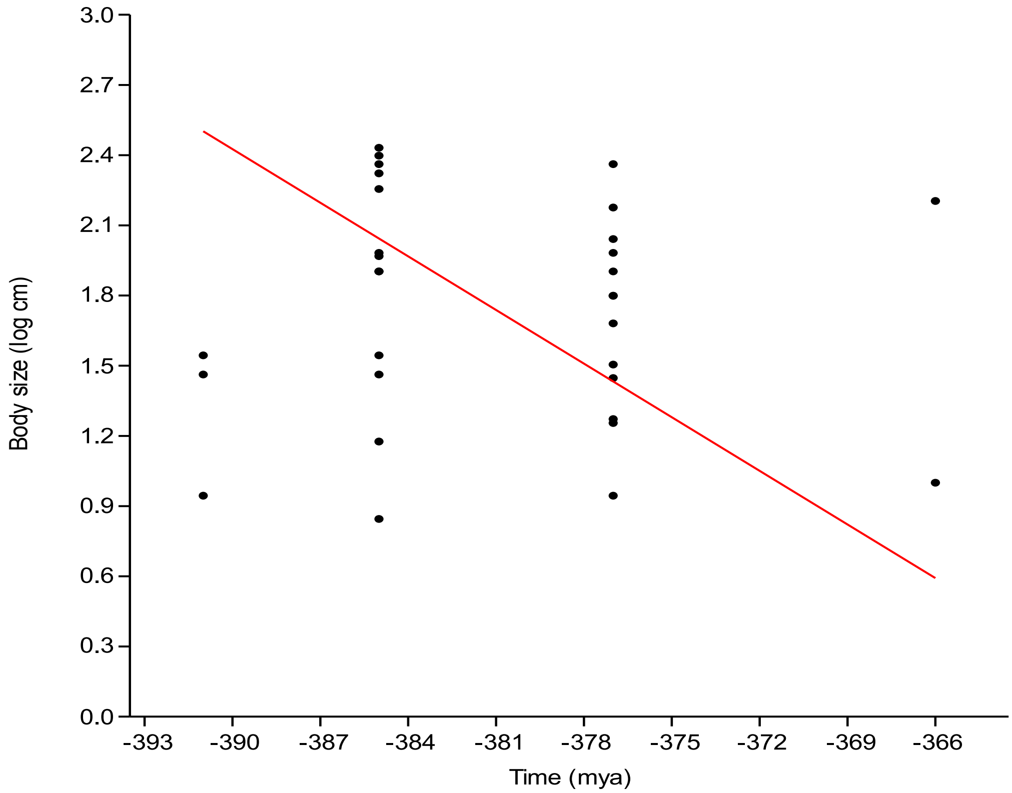

Fig. S43.

RMA regression: Devonian Ptyctodontida ("Placoderms") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S26 for metrics). Therefore, the mean transformed body length for the Devonian was plotted in Fig. S4C.

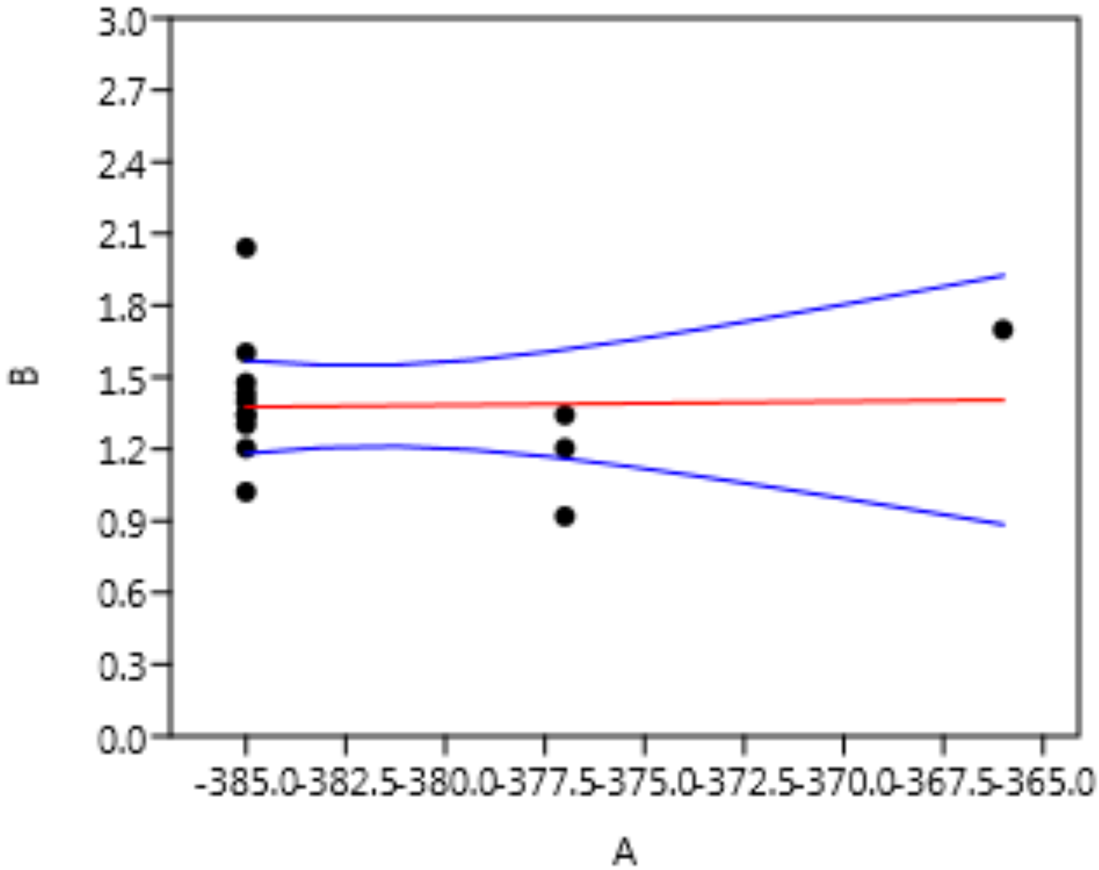

Fig. S44.

OLS regression: Devonian Phyllolepida ("Placoderms") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S25 for metrics). Therefore, the mean transformed body length for the Devonian was plotted in Fig. 1C.

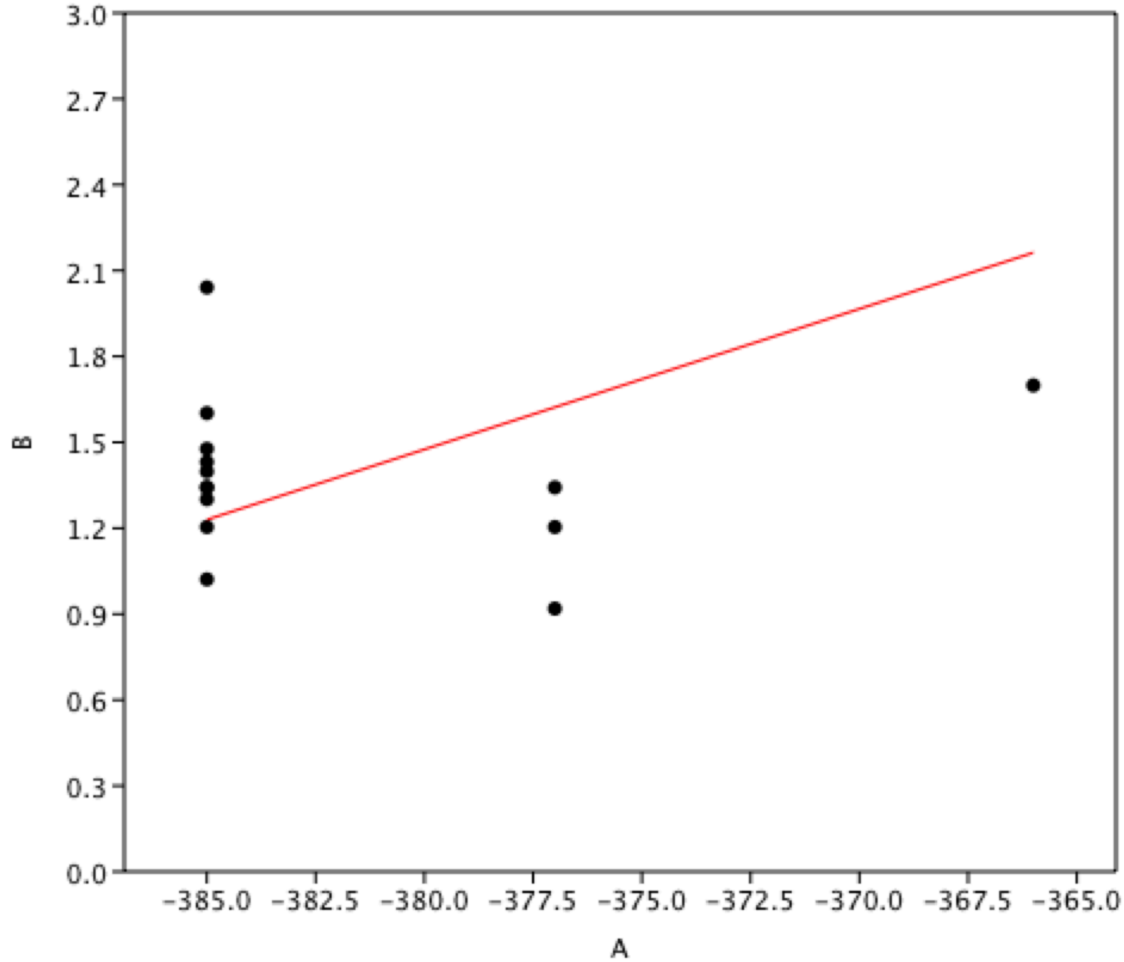

Fig. S45.
RMA regression: Devonian Phyllolepida ("Placoderms") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S26 for metrics). Therefore, the mean transformed body length for the Devonian was plotted in Fig. S4C.

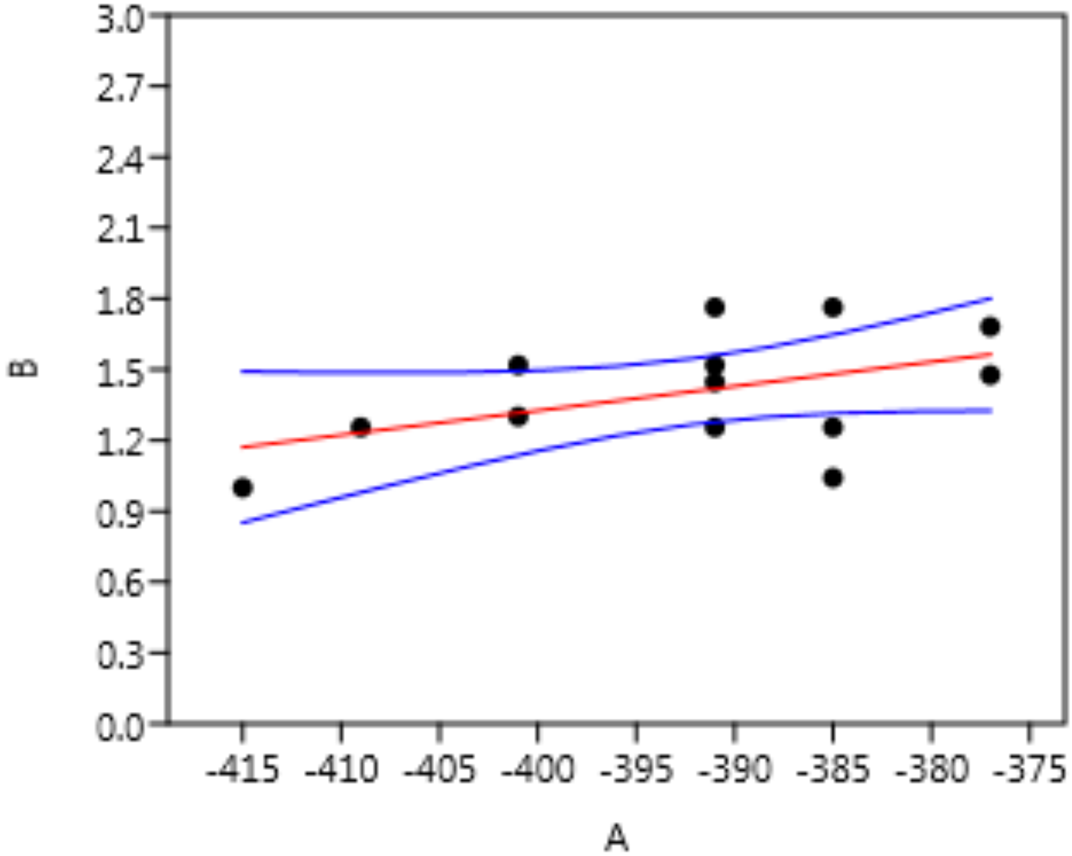

Fig. S46.

OLS regression: Devonian Petalichthyida ("Placoderms") body lengths and age. This regression did not produce a significant correlation (a=0.05) despite a large effect size (r=0.48; See Table S25 for metrics). This is probably due to low sample size in a few bins. Therefore, the mean log-transformed body length for the Devonian was plotted in Fig. 1C.

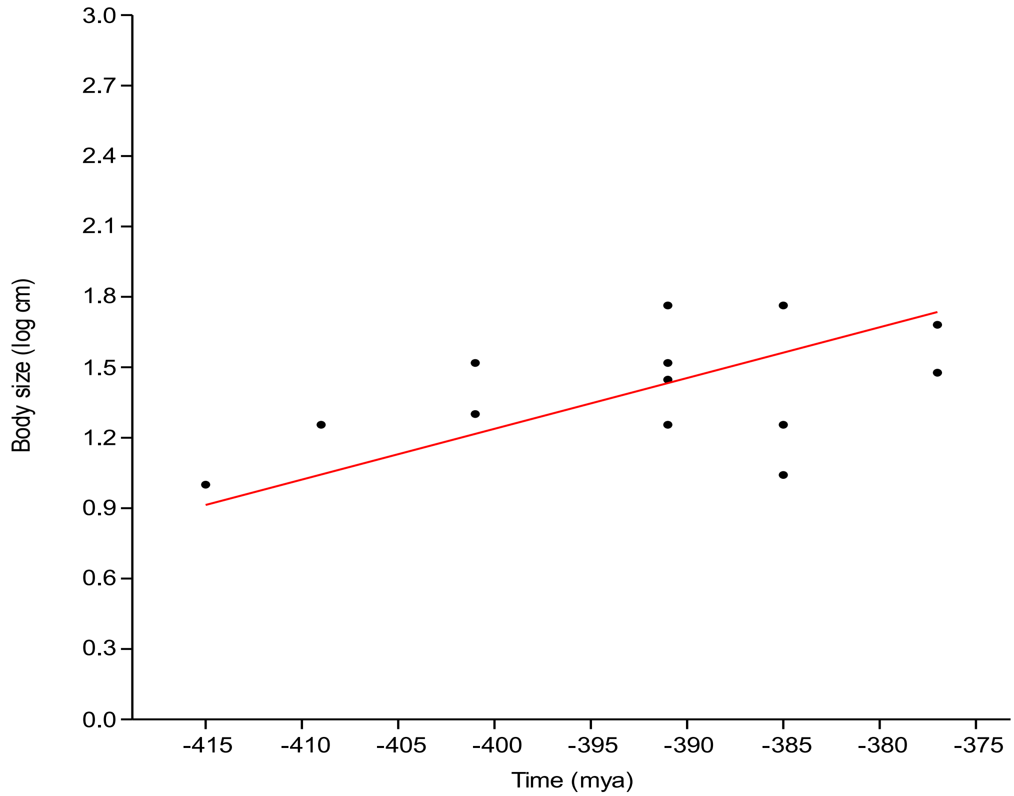

Fig. S47.

RMA regression: Devonian Petalichthyida (“Placoderms”) body lengths and age. This regression did not produce a significant correlation despite a large effect size (r=0.47; See Table S26 for metrics). This is probably due to low sample size in a few bins. Therefore, the mean log-transformed body length for the Devonian was plotted in Fig. S4C.

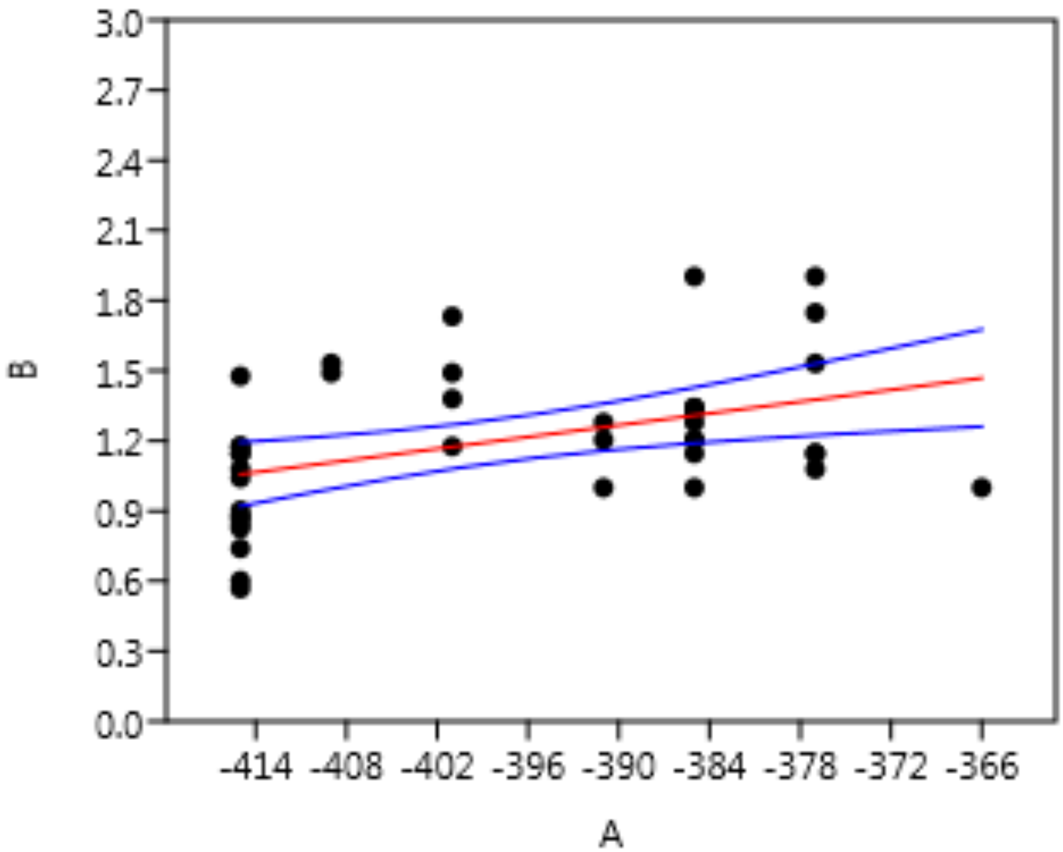

Fig. S48.
OLS regression: Devonian Climatiida ("Acanthodians") body lengths and age. See Table S27 for metrics.

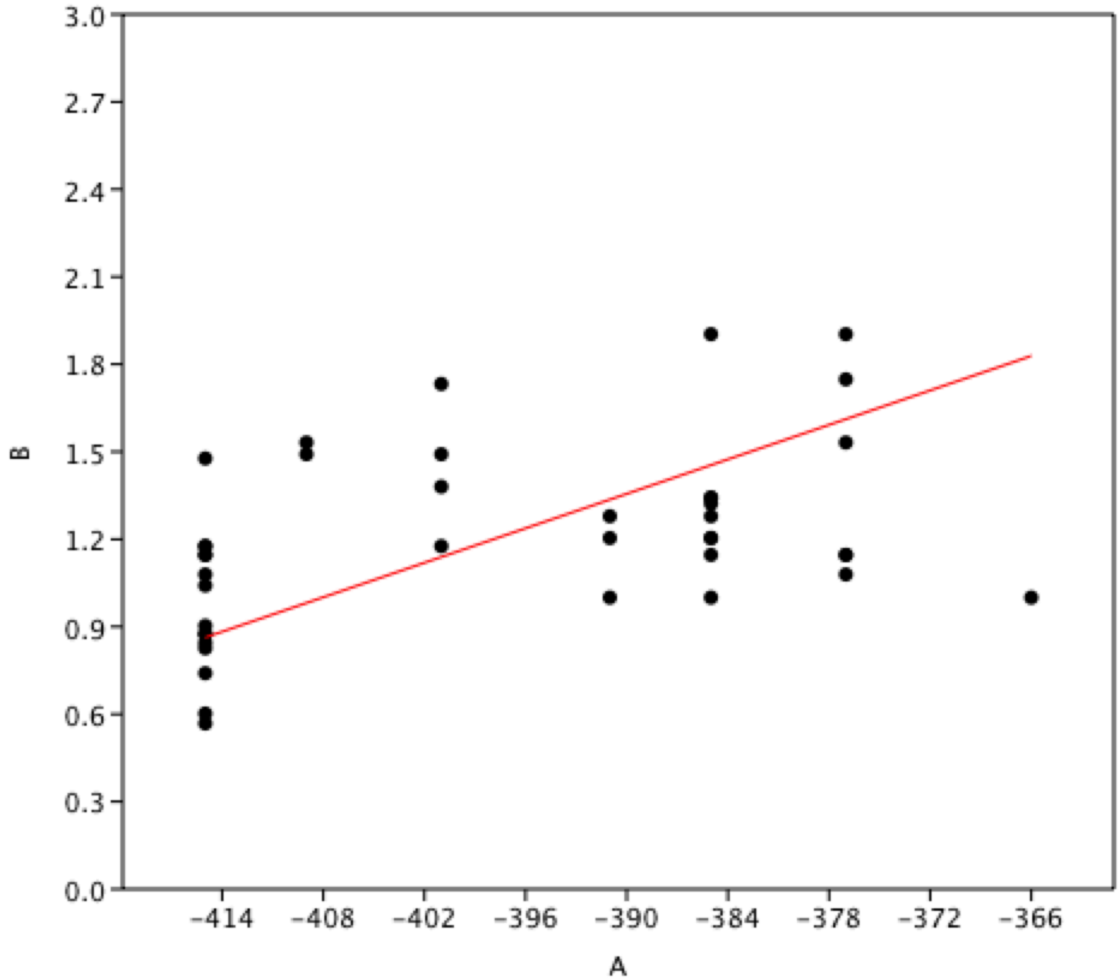

Fig. S49.
RMA regression: Devonian Climatiida ("Acanthodians") body lengths and age. See Table S28 for metrics.

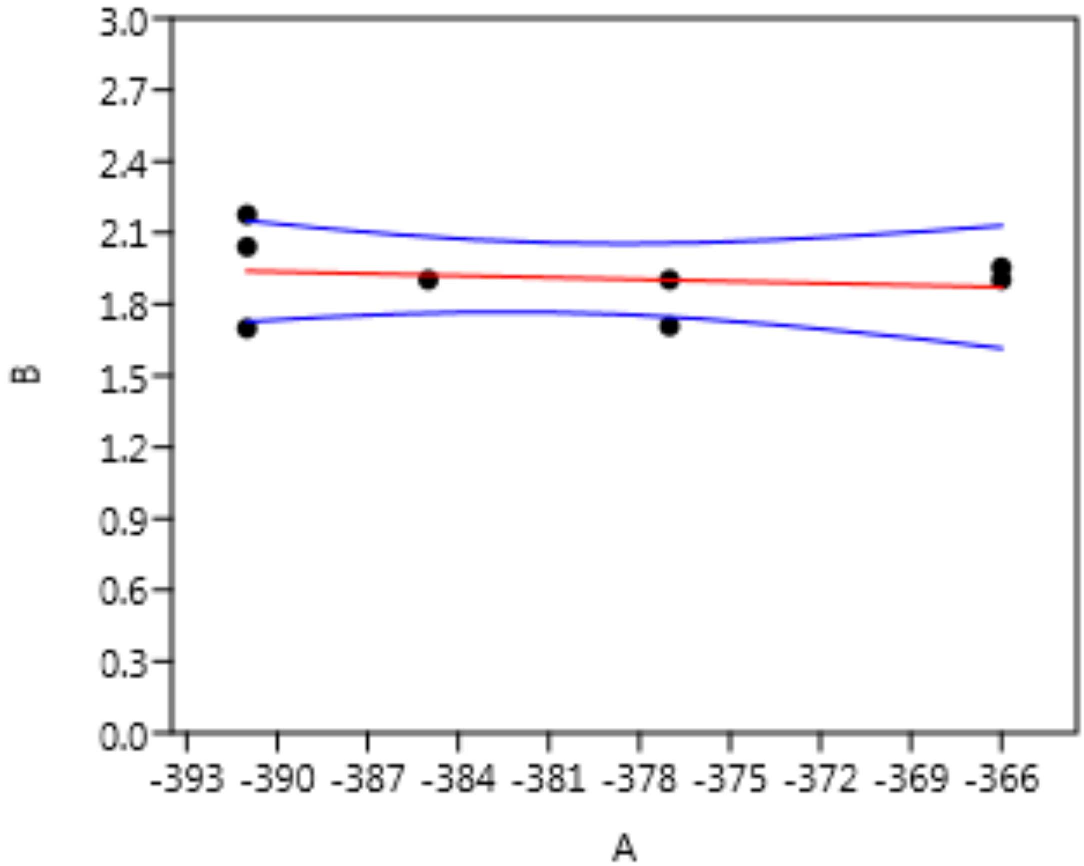

Fig. S50.

OLS regression: Devonian Gyracanthida ("Acanthodians") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S27 for metrics). This was likely due to low sample size in the later Devonian. Therefore, the mean transformed body length for the Devonian was plotted in Fig. 1C.

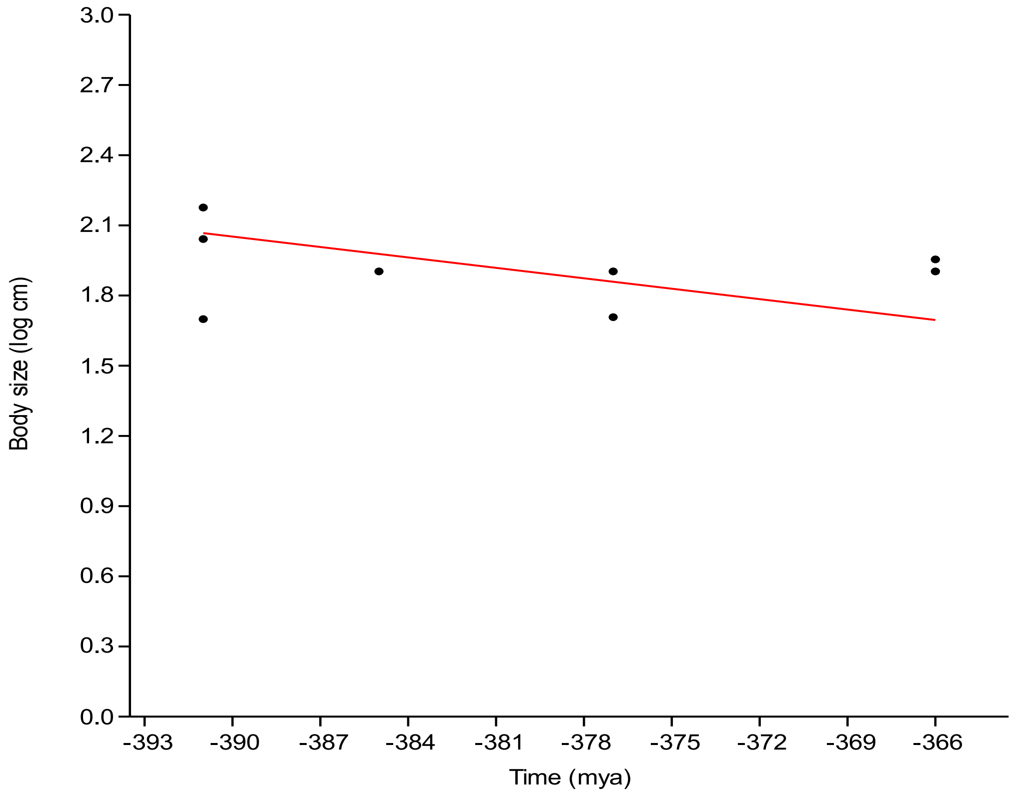

Fig. S51.

RMA regression: Devonian Gyracanthida ("Acanthodians") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S28 for metrics). This was likely due to low sample size in the later Devonian. Therefore, the mean transformed body length for the Devonian was plotted in Fig. S4C.

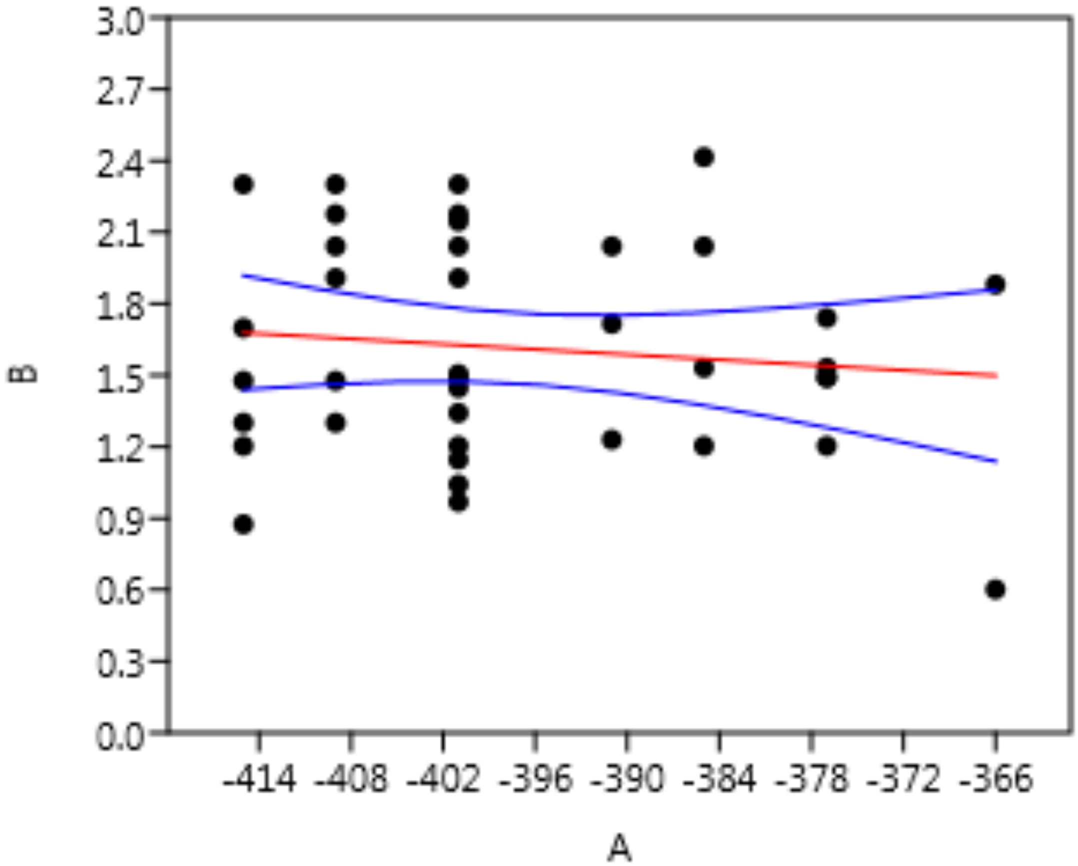

Fig. S52.

OLS regression: Devonian Ischnacanthida ("Acanthodians") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S27 for metrics). This was likely due to low sample size in the later Devonian. Therefore, the mean transformed body length for the Devonian was plotted in Fig. 1C.

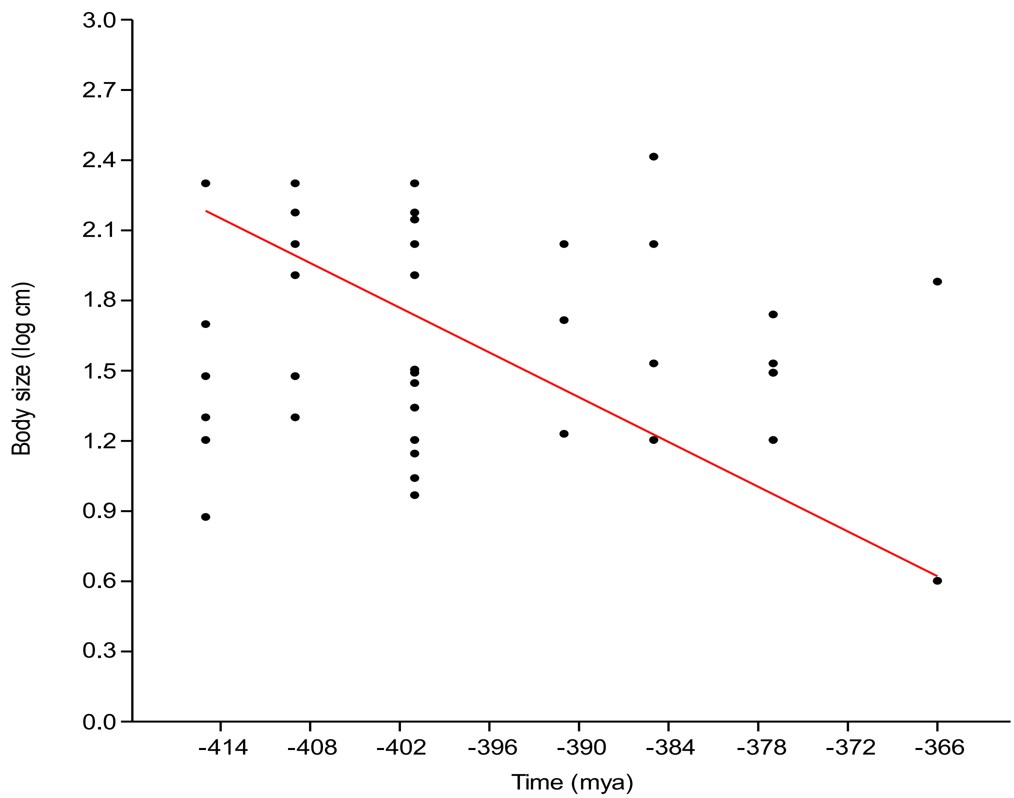

Fig. S53.

RMA regression: Devonian Ischnacanthida ("Acanthodians") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S28 for metrics). This was likely due to low sample size in the later Devonian. Therefore, the mean transformed body length for the Devonian was plotted in Fig. S4C.

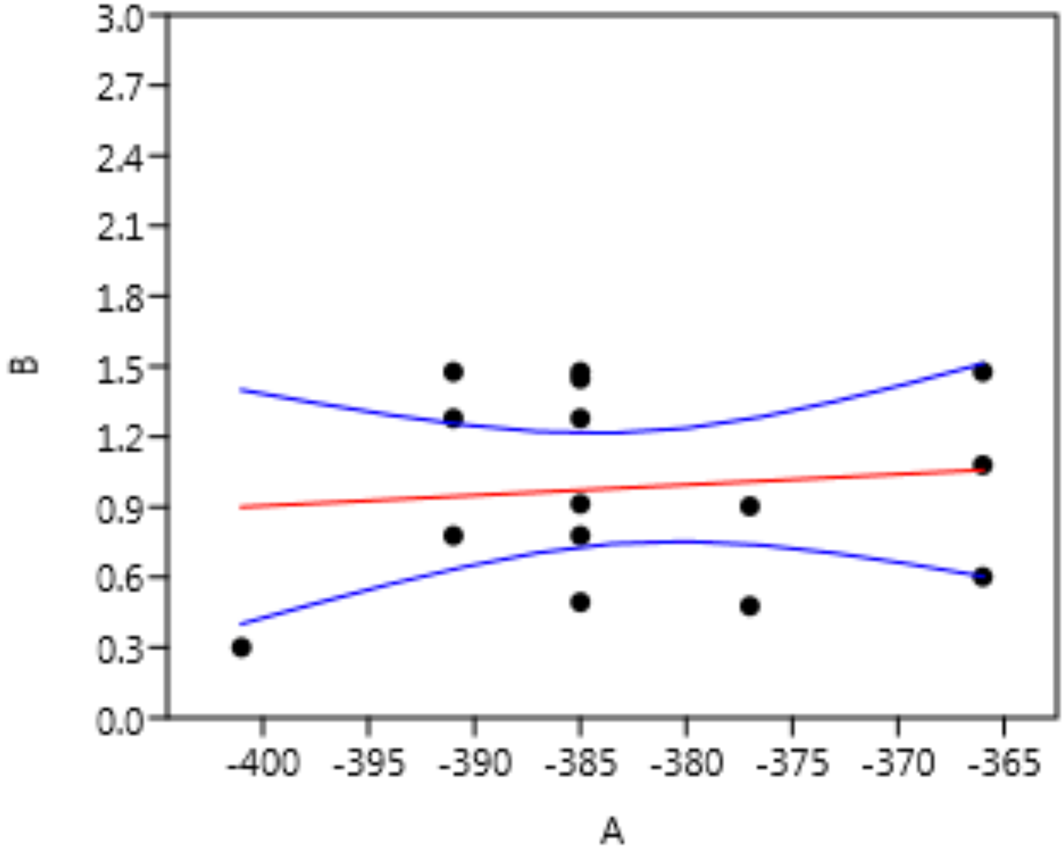

Fig. S54.

OLS regression: Devonian Acanthodida ("Acanthodians") size/age. This regression did not produce a significant correlation or effect size (See Table S27 for metrics). This was likely due to low sample size. Therefore, the mean transformed body length for the Devonian was plotted in Fig. 1C.

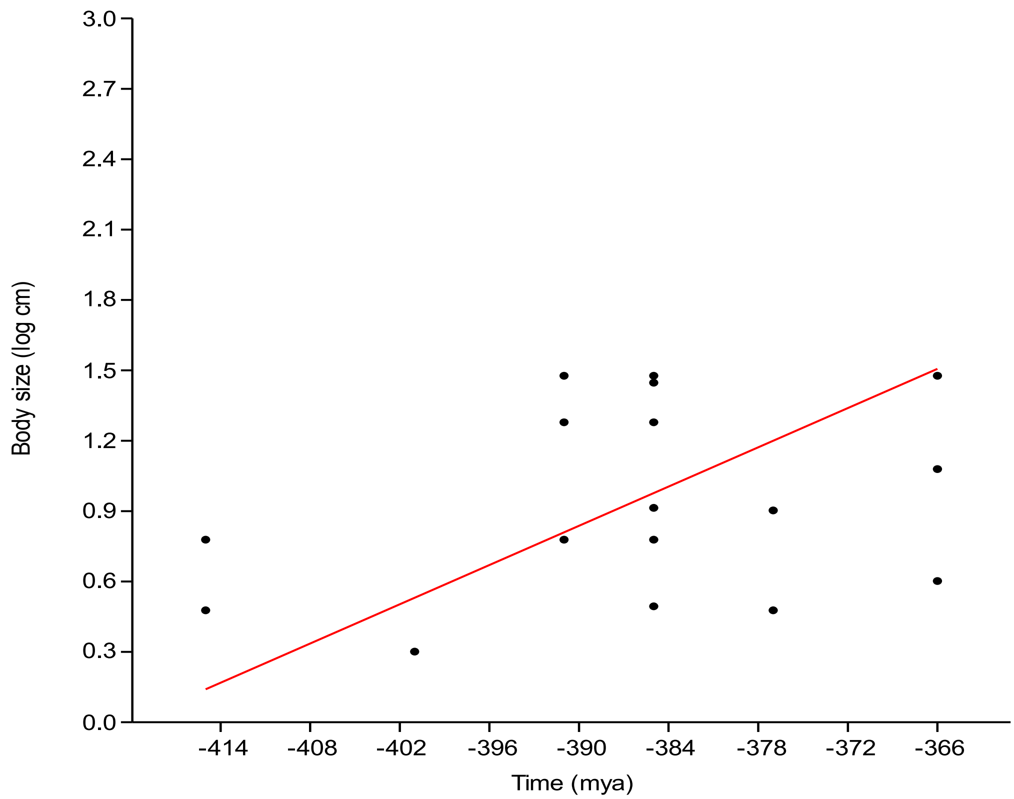

Fig. S55.

RMA regression: Devonian Acanthodida ("Acanthodians") size/age. This regression did not produce a significant correlation but had a medium effect size (r=0.29; See Table S28 for metrics). The former was likely due to low sample size. Therefore, the mean transformed body length for the Devonian was plotted in Fig. 4SC.

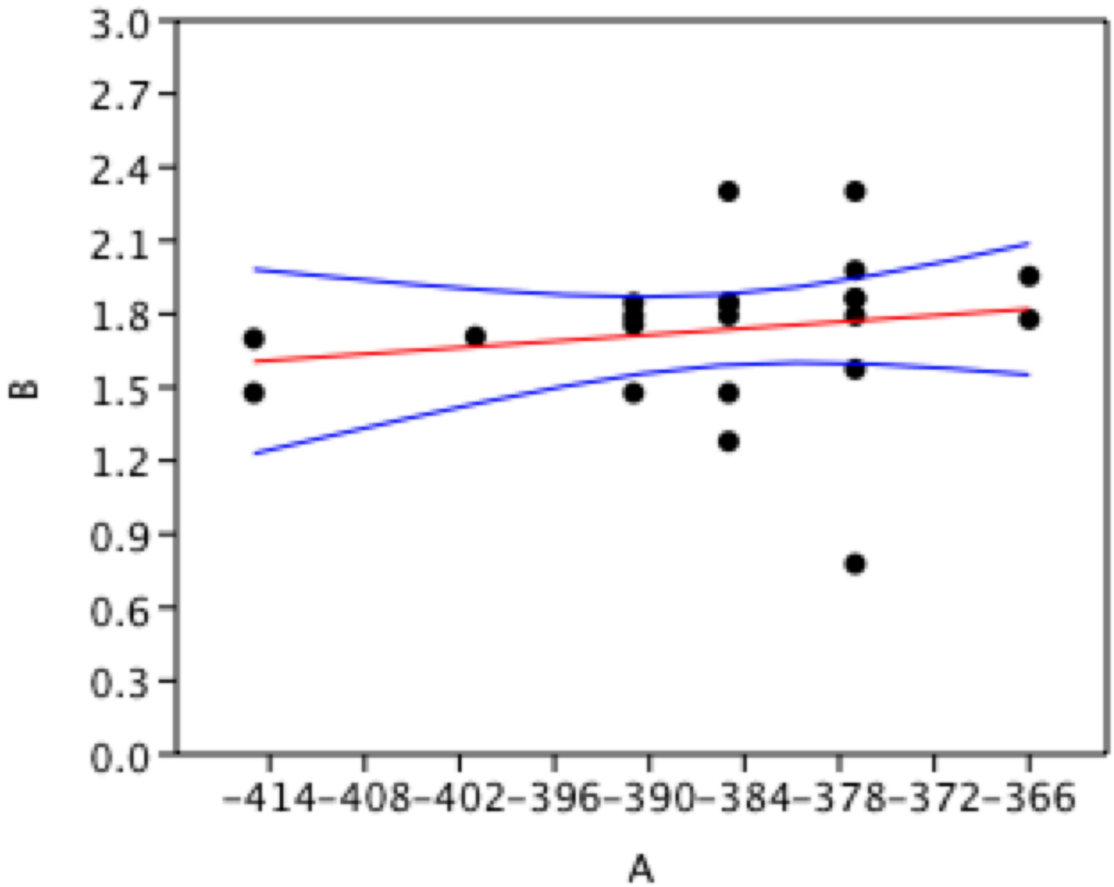

Fig. S56.

OLS regression: Devonian Porolepiformes (Sarcopterygii) size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S29 for metrics). This was likely due to low sample size in the early Devonian. The mean transformed body length for the Devonian was plotted in Fig. 1C.

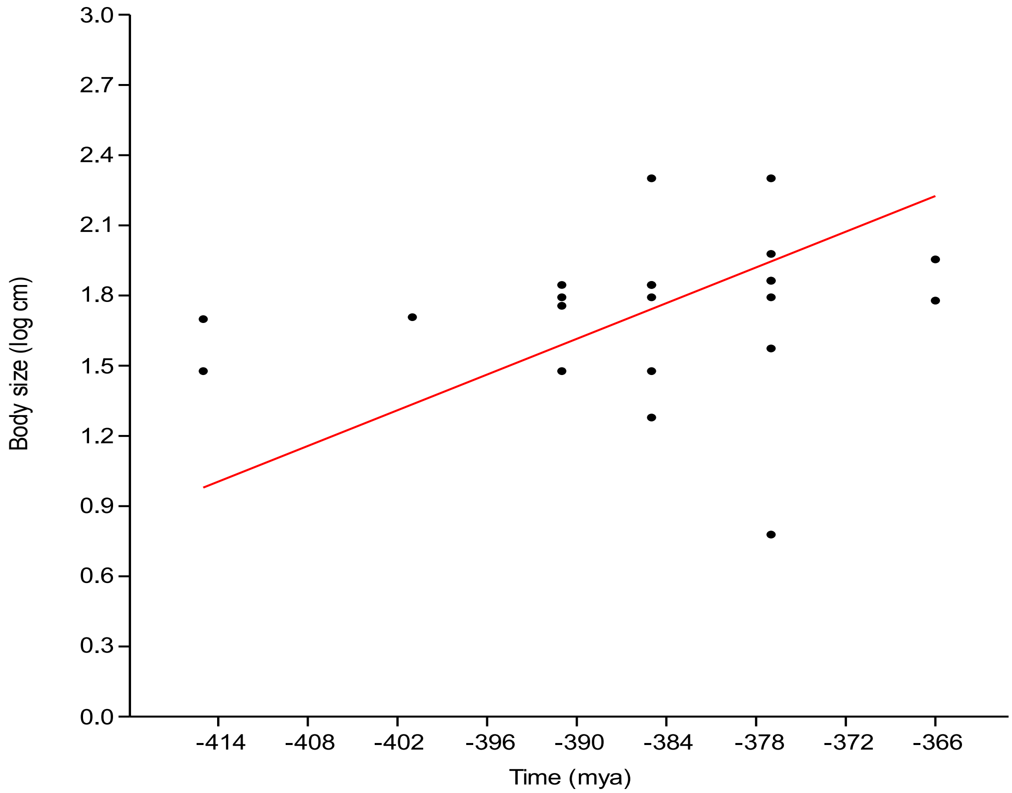

Fig. S57.
RMA regression: Devonian Porolepiformes (Sarcopterygii) body lengths and age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S30 for metrics). This was likely due to low sample size in the later Devonian. The mean transformed body length for the Devonian was plotted in Fig. 4SC.

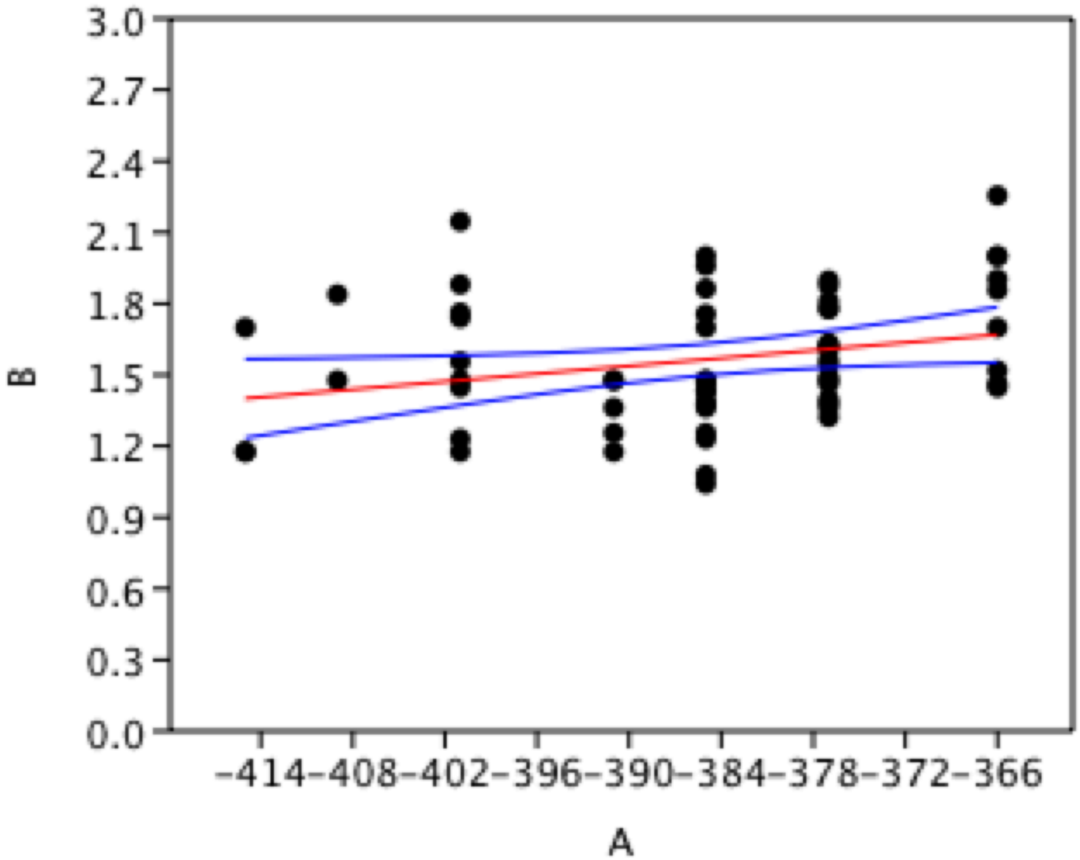

Fig. S58.
OLS regression: Devonian Dipnoi (Sarcopterygii) size/age. See Table S29 for metrics.

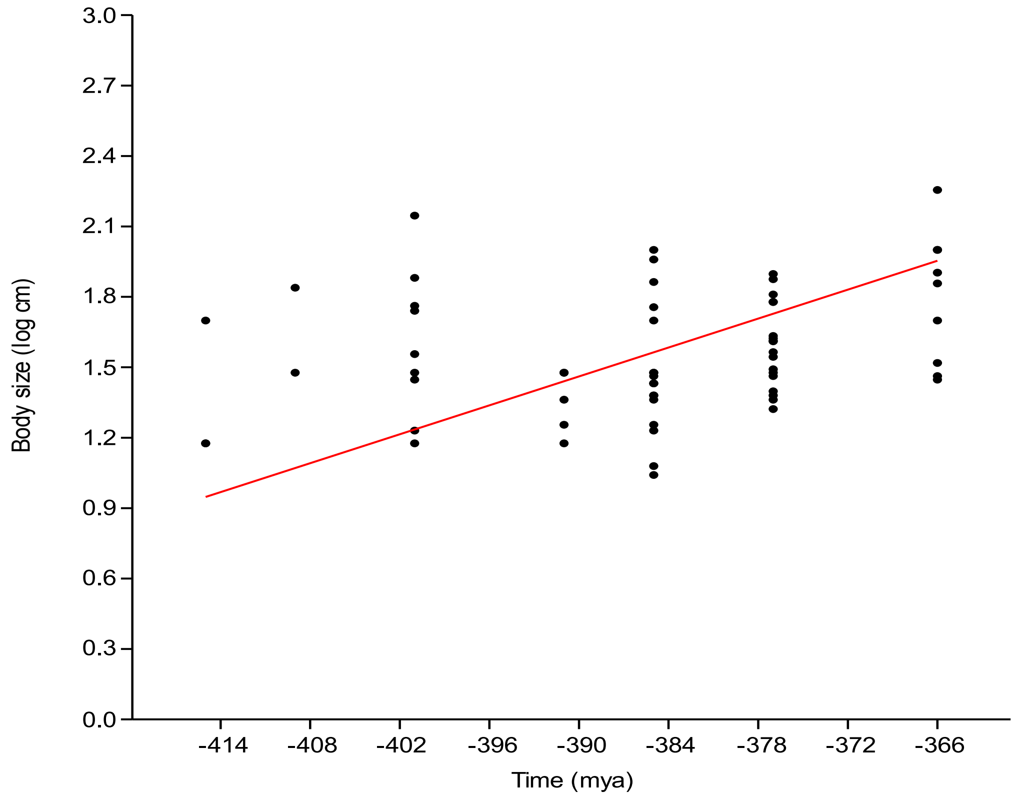

Fig. S59.
RMA regression: Devonian Dipnoi (Sarcopterygii) size/age. See Table S30 for metrics.

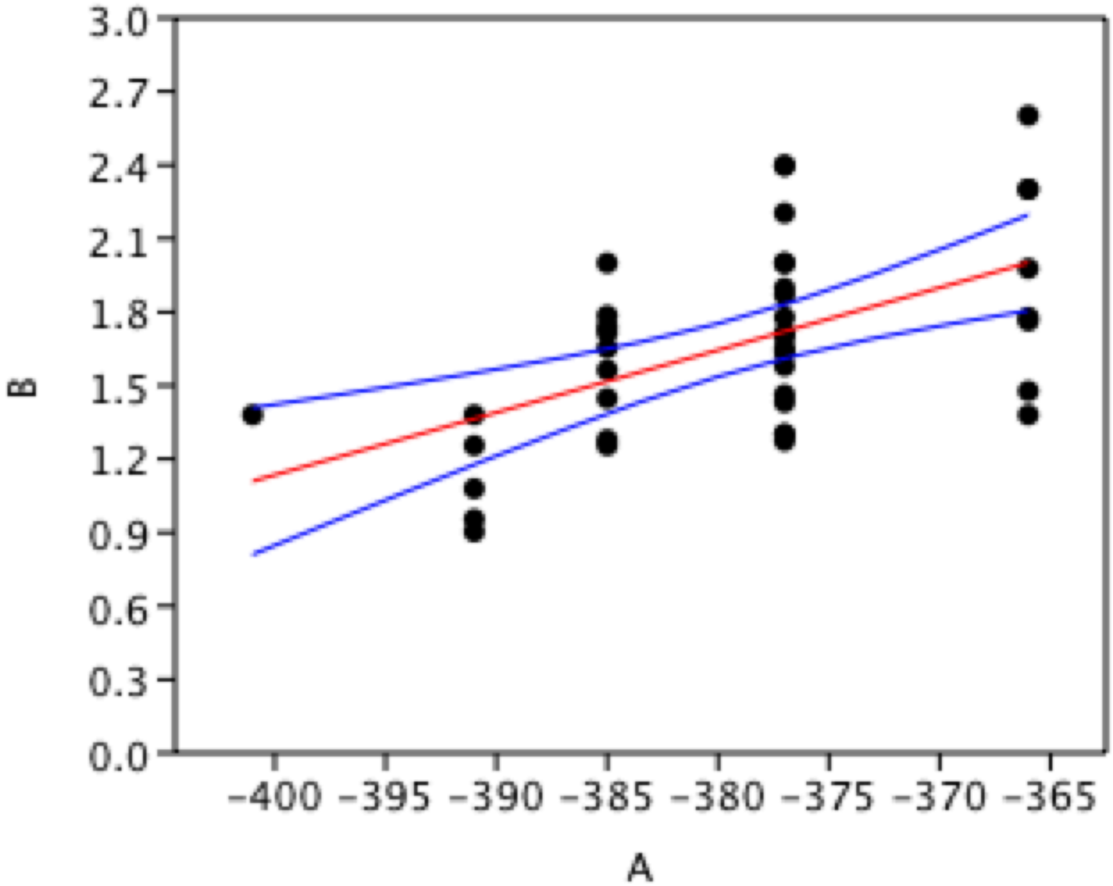

Fig. S60.

OLS regression: Devonian Osteolepiformes (Sarcopterygii) size/age. See Table S29 for metrics.

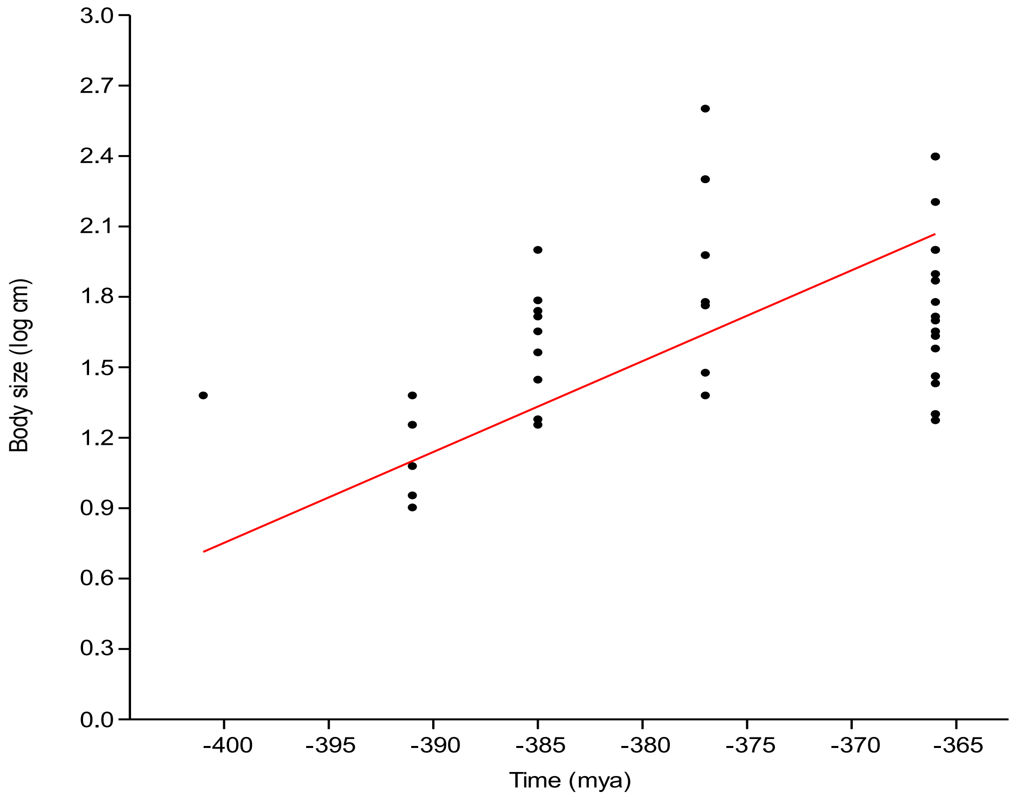

Fig. S61.

RMA regression: Devonian Osteolepiformes (Sarcopterygii) body lengths and age. See Table S30 for metrics.

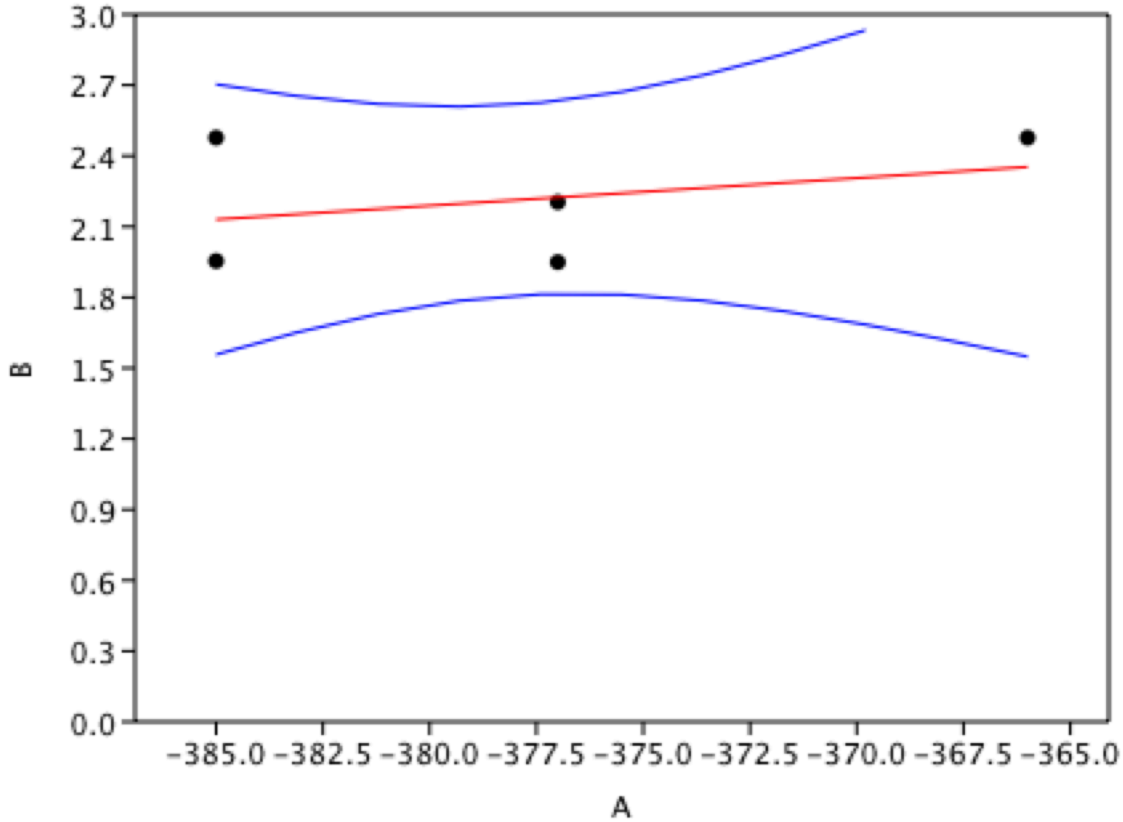

Fig. S62.

OLS regression: Devonian Rhizodontida (Sarcopterygii) size/age. This regression did not produce a significant correlation despite a moderate-strong effect size (r=0.35; See Table S29 for metrics). This was likely due to extremely low sample size in the later Devonian. Therefore, the mean transformed body length for the Devonian was plotted in Fig. 1C.

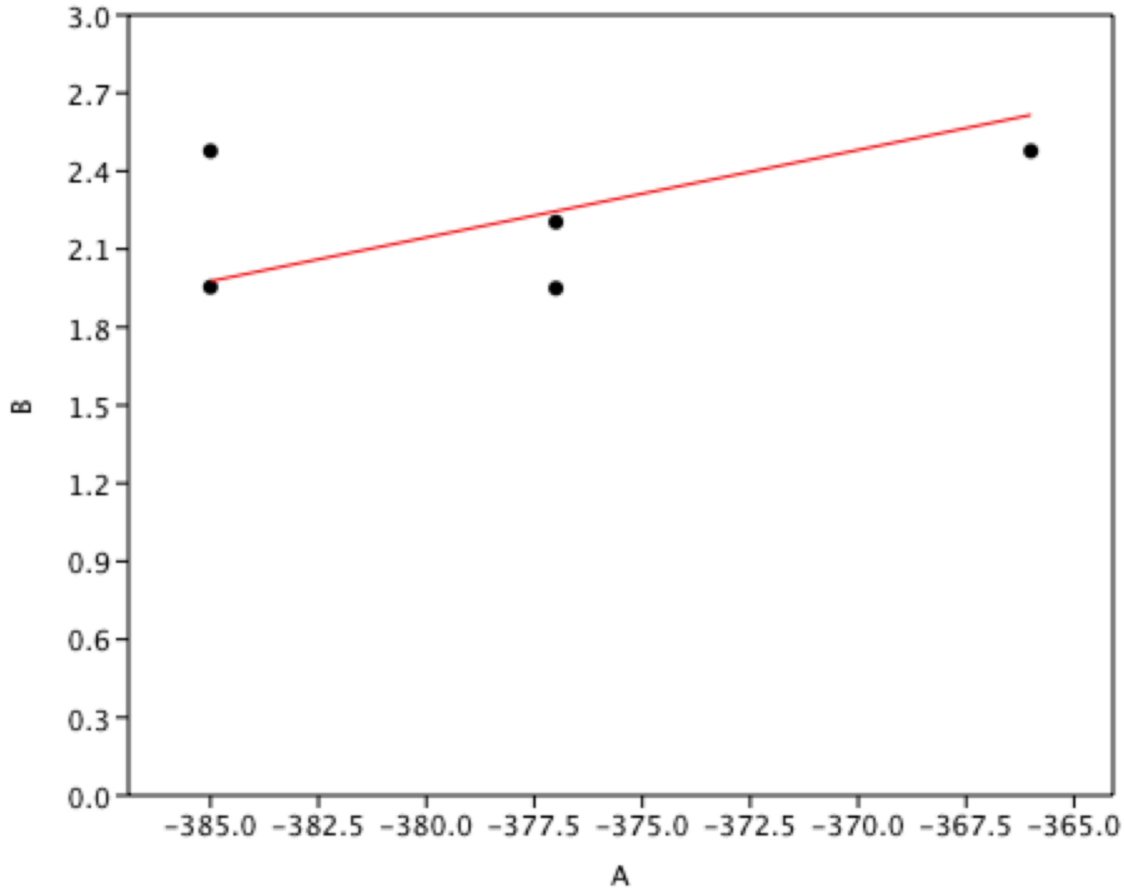

Fig. S63.
RMA regression: Devonian Rhizodontida (Sarcopterygii) size/age. This regression did not produce a significant correlation despite a moderate-strong effect size (r=0.35; See Table S30 for metrics). This was likely due to extremely low sample size in the later Devonian. Therefore, the mean transformed body length for the Devonian was plotted in Fig. S4C.

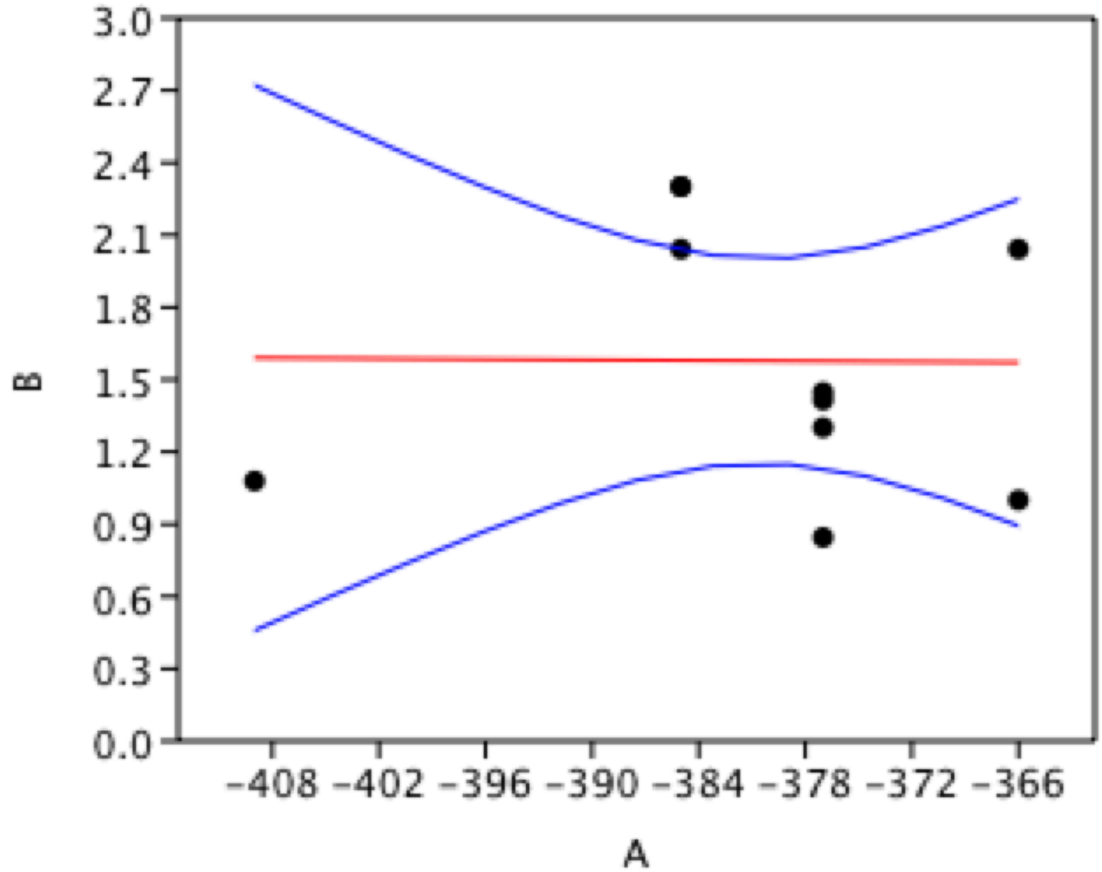

Fig. S64.

OLS regression: Devonian Actinistia (Sarcopterygii) size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S29 for metrics). This was likely due to extremely low sample size Devonian. Therefore, the mean transformed body length for the Devonian was plotted in Fig. 1C.

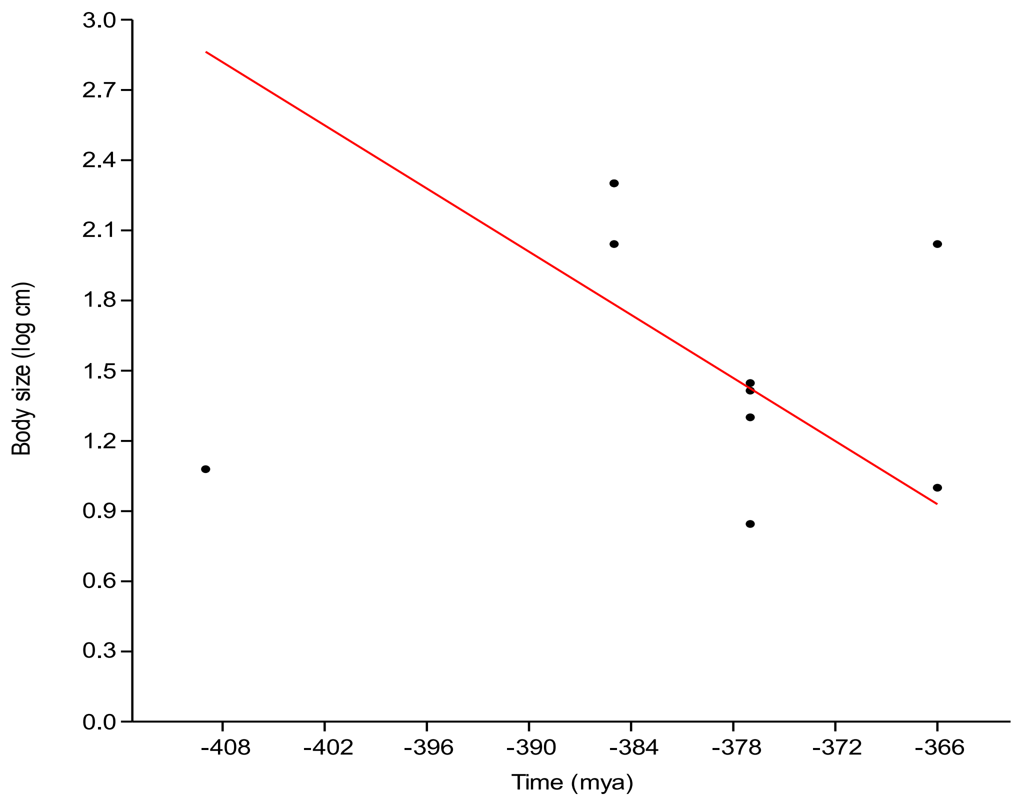

Fig. S65.

RMA regression: Devonian Actinistia (Sarcopterygii) size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S30 for metrics). This was likely due to extremely low sample size Devonian. Therefore, the mean transformed body length for the Devonian was plotted in Fig. S4C.

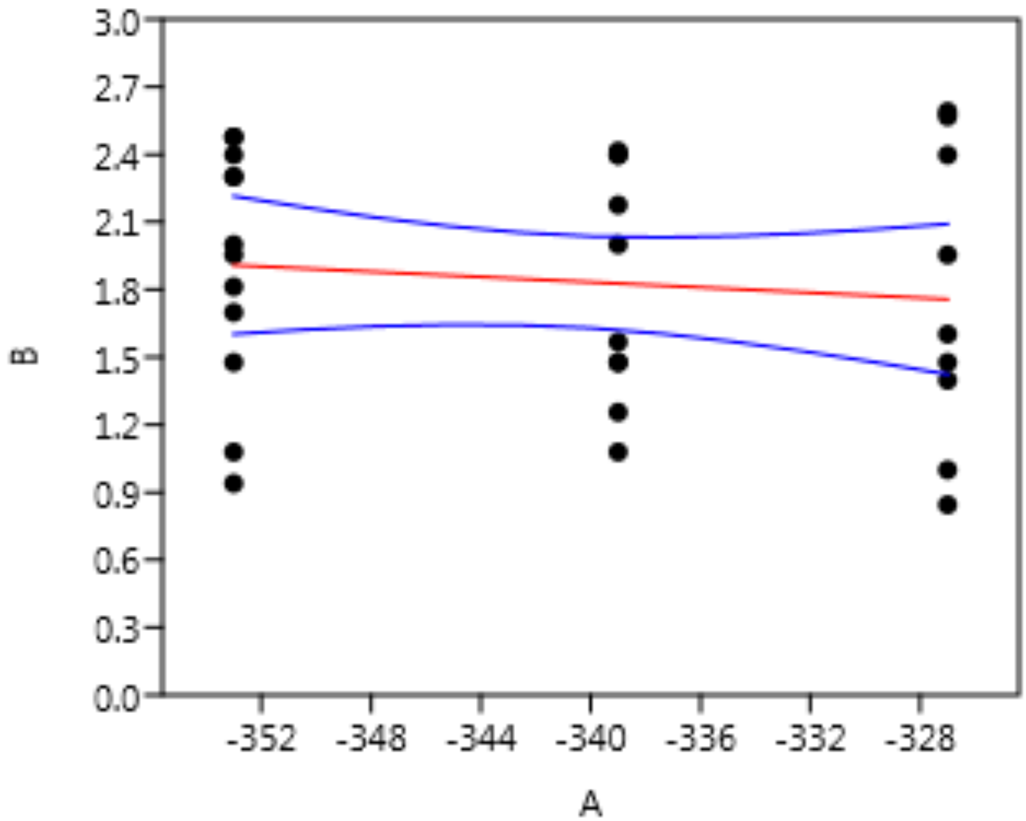

Fig. S66.

OLS regression: Mississippian “Acanthodian” size/age. This regression did not produce a significant correlation and had a low effect size (See Table S32 for metrics). This was likely due to divergent sizes and diversity in the two remaining lineages (Acanthodids and Gyracanthids). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 1B.

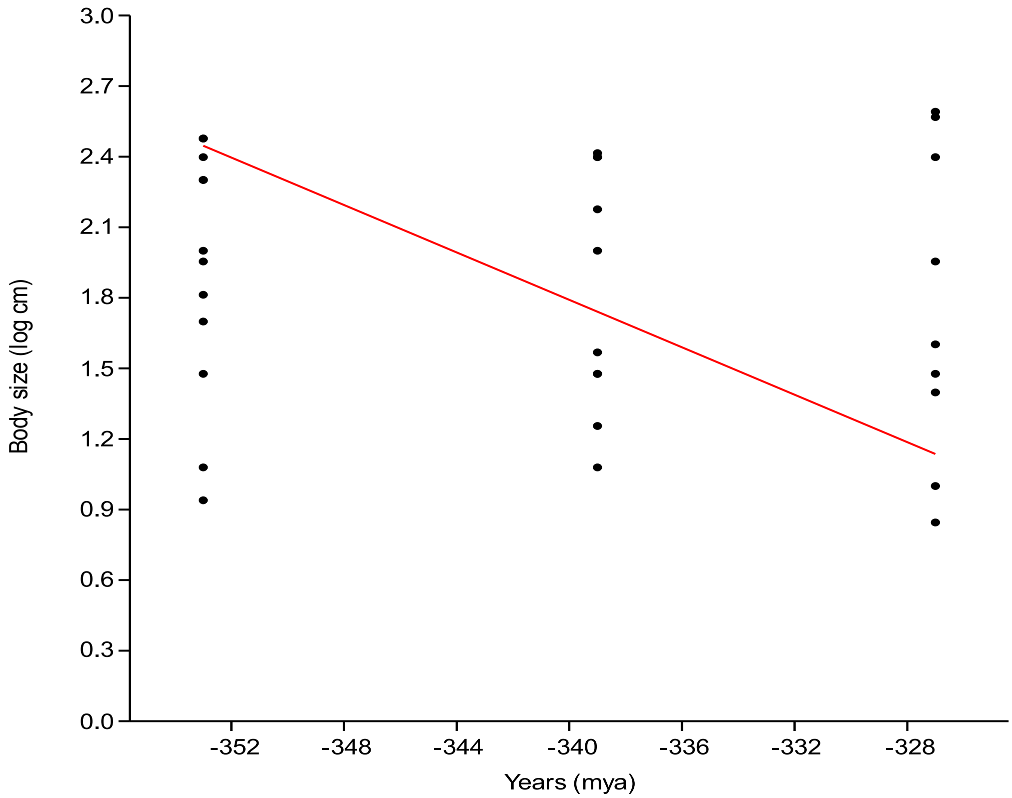

Fig. S67.

RMA regression: Mississippian "Acanthodian" size/age. This regression did not produce a significant correlation and had a moderate effect size (See Table S33 for metrics). This was likely due to divergent sizes in the two remaining lineages. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. S4B.

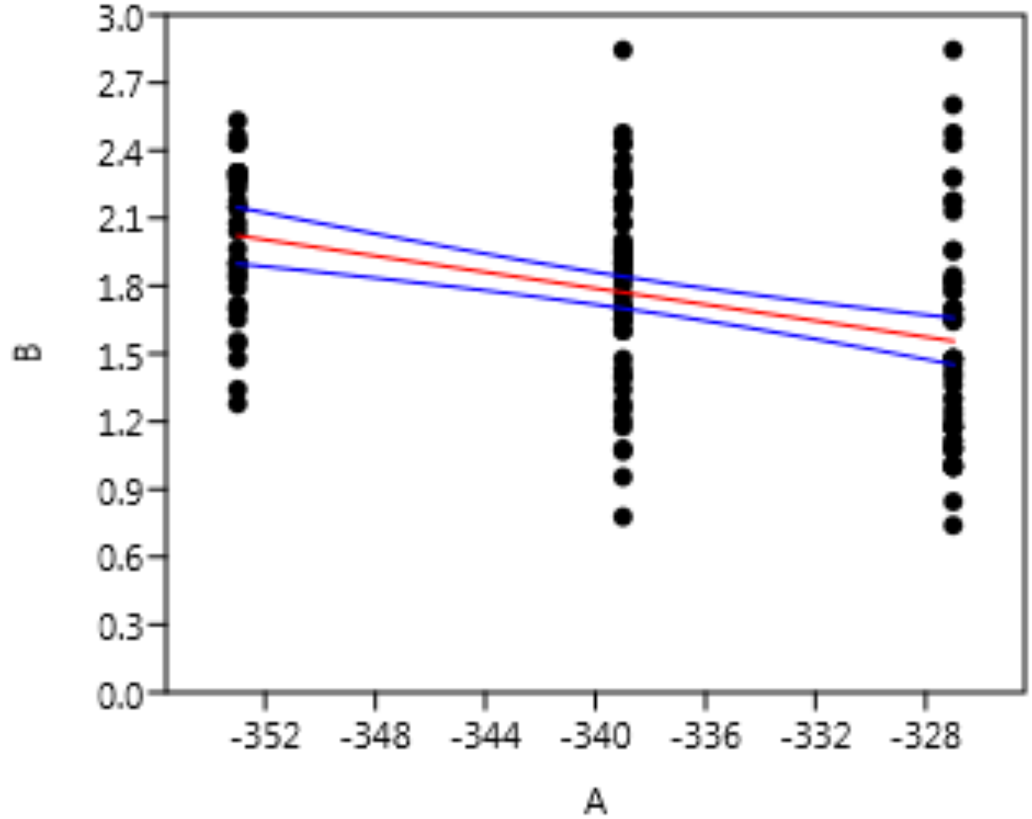

Fig. S68.
OLS regression: Mississippian Chondrichthyes body lengths and age. See Table S32 for metrics.

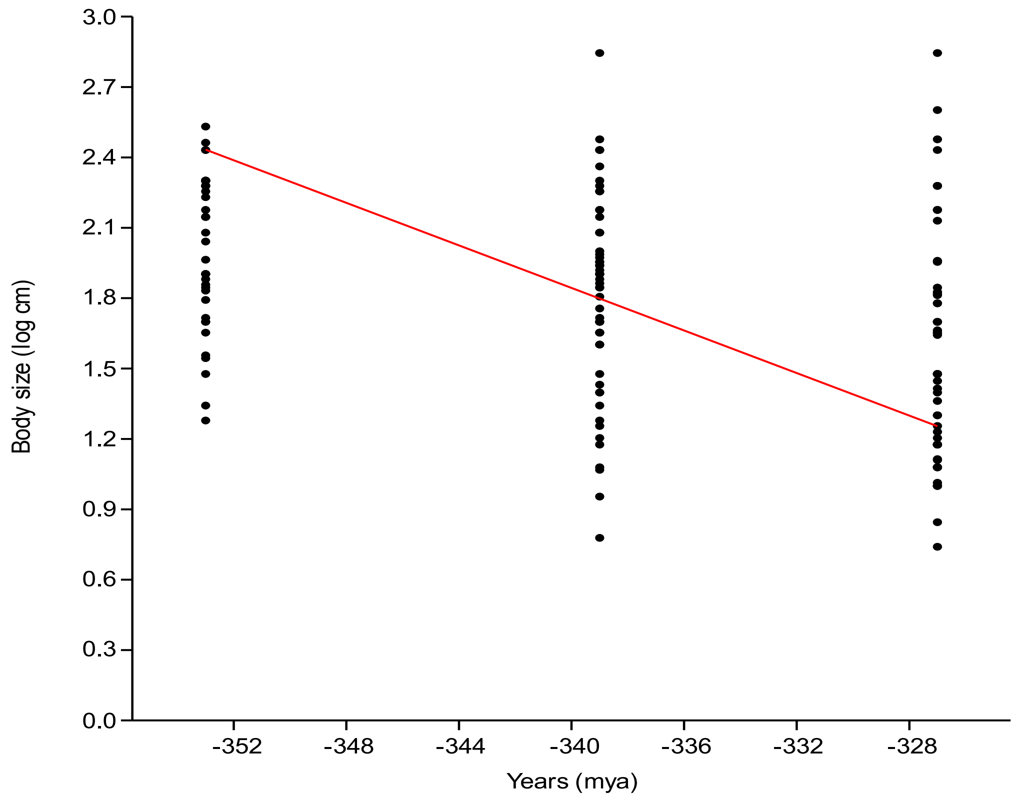

Fig. S69.
RMA regression: Mississippian "Chondrichthyes" body lengths and age. See Table S33 for metrics.

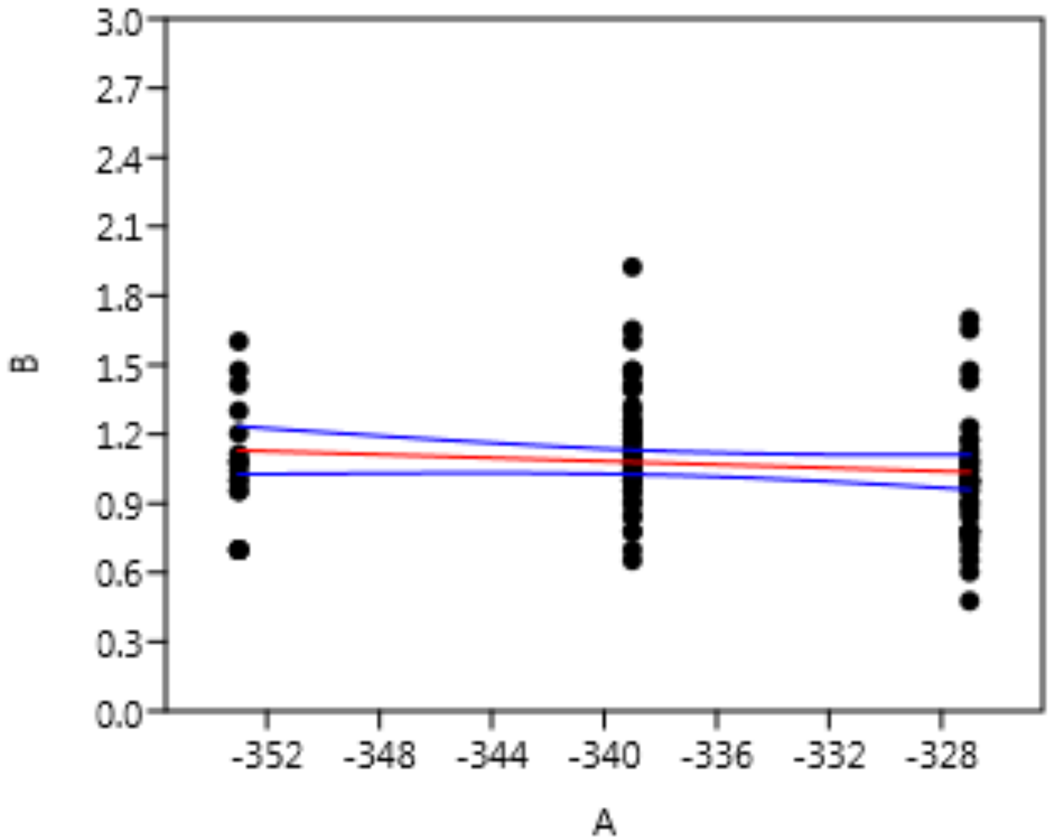

Fig. S70.

OLS regression: Mississippian Actinopterygii size/age. This regression did not produce a significant correlation despite a moderate effect size (See Table S32 for metrics). As the sample size was large, this may represents real stasis in size parameters. However, Mann-Whitney U results suggest significant change in the distribution, likely representing a shift towards a greater number of smaller taxa. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. S1B.

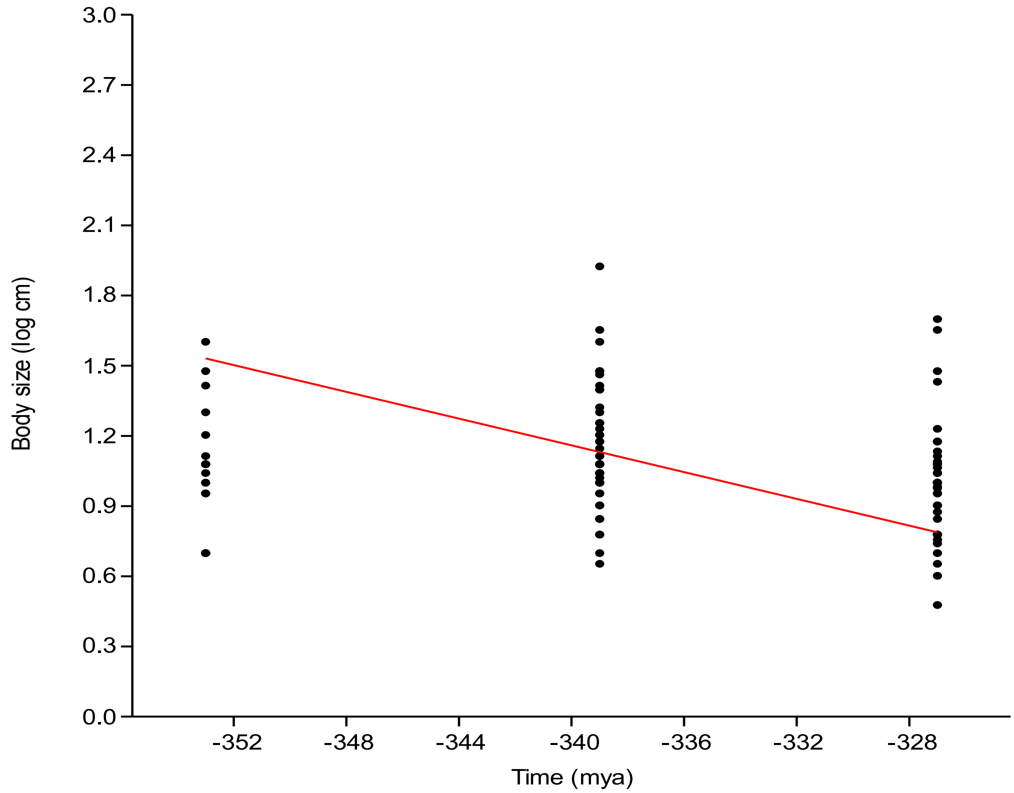

Fig. S71.

RMA regression: Mississippian Actinopterygii size/age. This regression did not produce a significant correlation despite a moderate effect size (See Table S32 for metrics). However, Mann-Whitney U results suggest significant change in the distribution, likely representing a shift towards a greater number of smaller taxa. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. S4B.

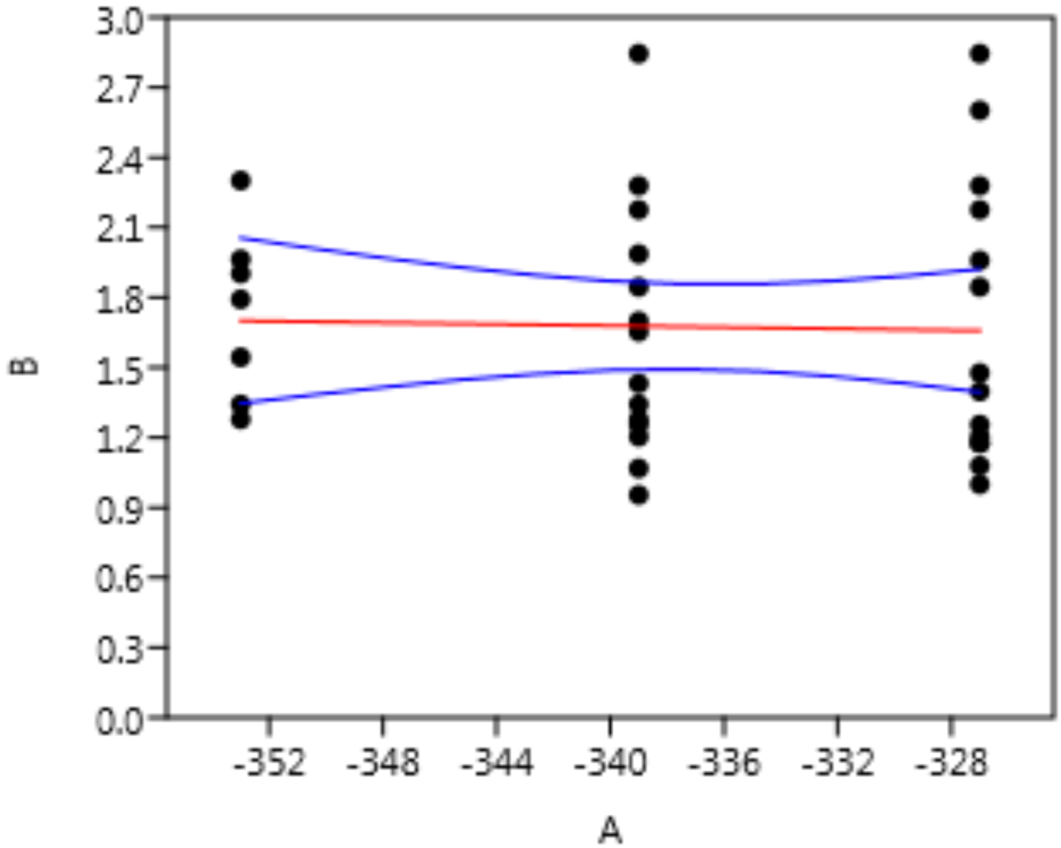

Fig. S72.

OLS regression: Mississippian Sarcopterygii body lengths and age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S32 for metrics). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 1B.

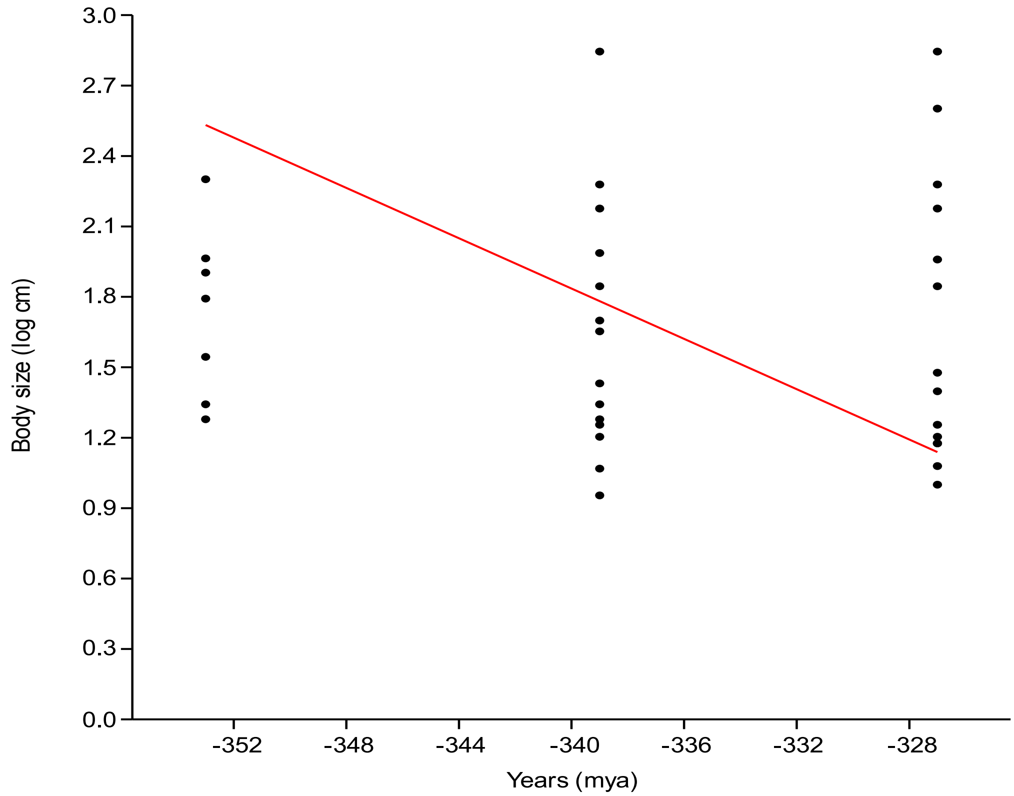

Fig. S73.

RMA regression: Mississippian Sarcopterygii body lengths and age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S32 for metrics). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 4SB.

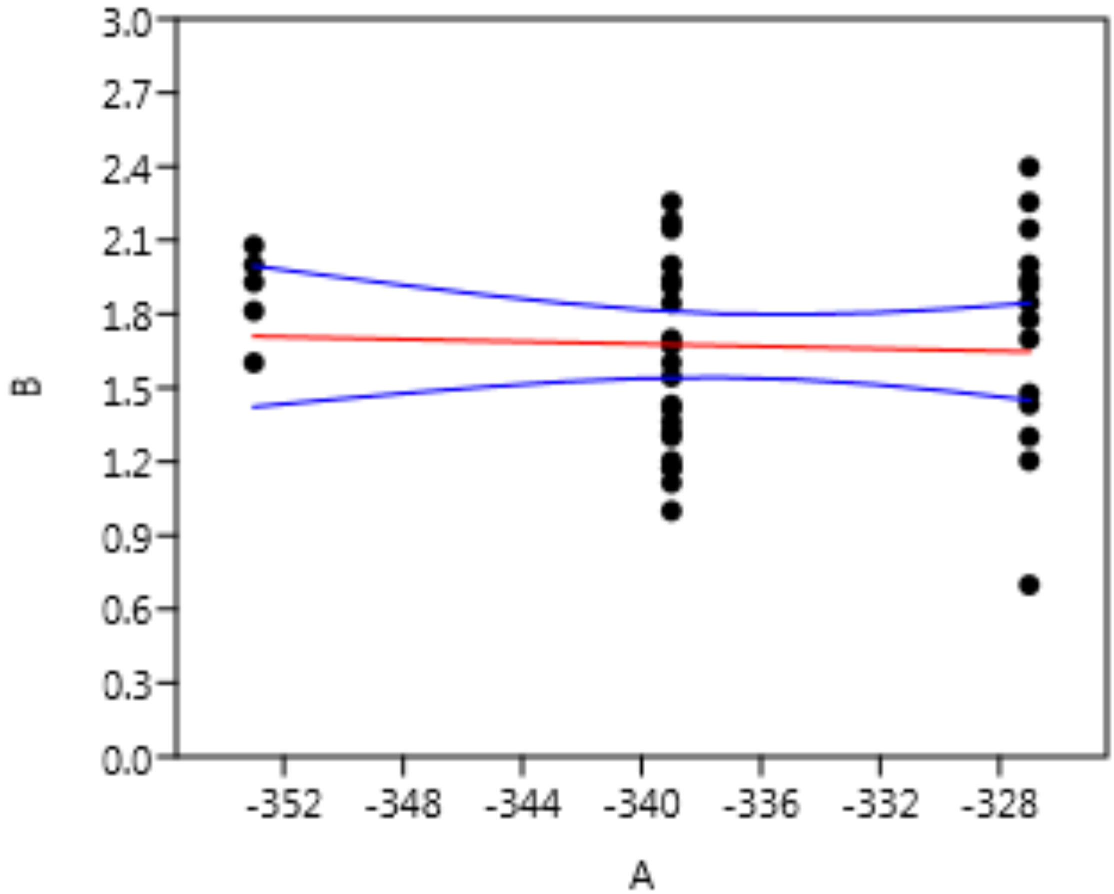

Fig. S74.

OLS regression: Mississippian Tetrapoda size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S32 for metrics). This is likely because of the existence of larger taxa in Mississippian freshwater ecosystems, mirroring either a faster return to Late Devonian size distributions or undersampling of smaller tetrapods in such environments (see Figure 2C). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 1B.

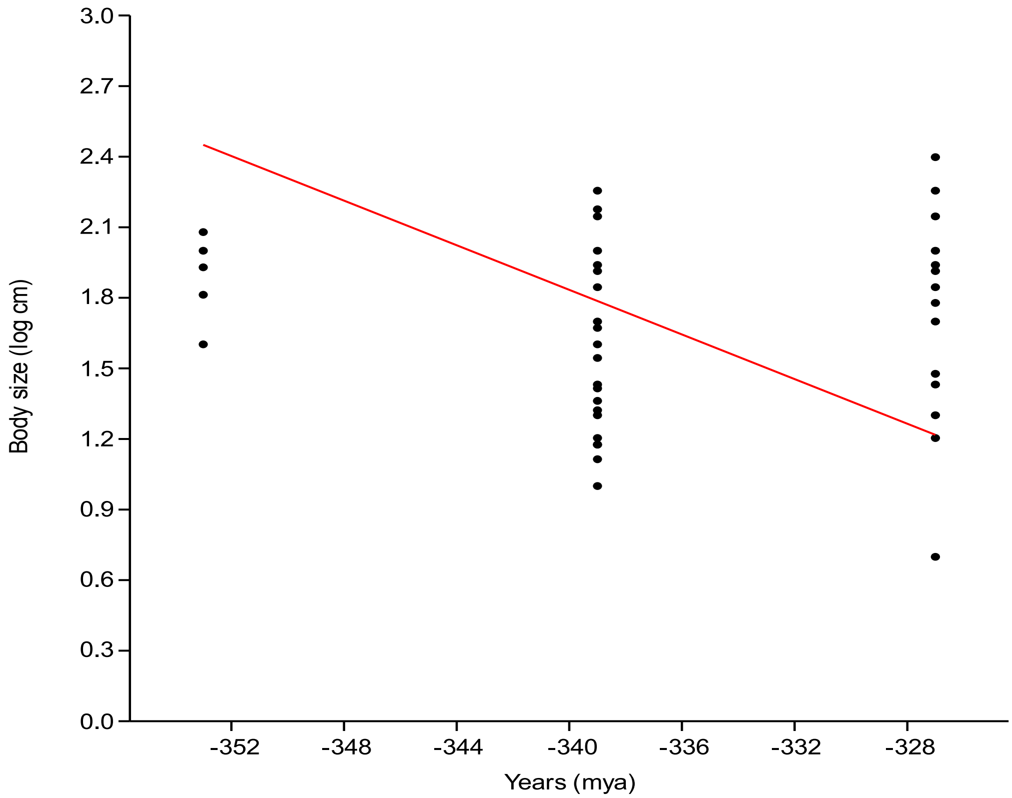

Fig. S75.

RMA regression: Mississippian Tetrapoda size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S33 for metrics). This is likely because of the existence of larger taxa in Mississippian freshwater ecosystems, mirroring either a faster return to Late Devonian size distributions or undersampling of smaller tetrapods in such environments (see Figure 2C). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 4SB.

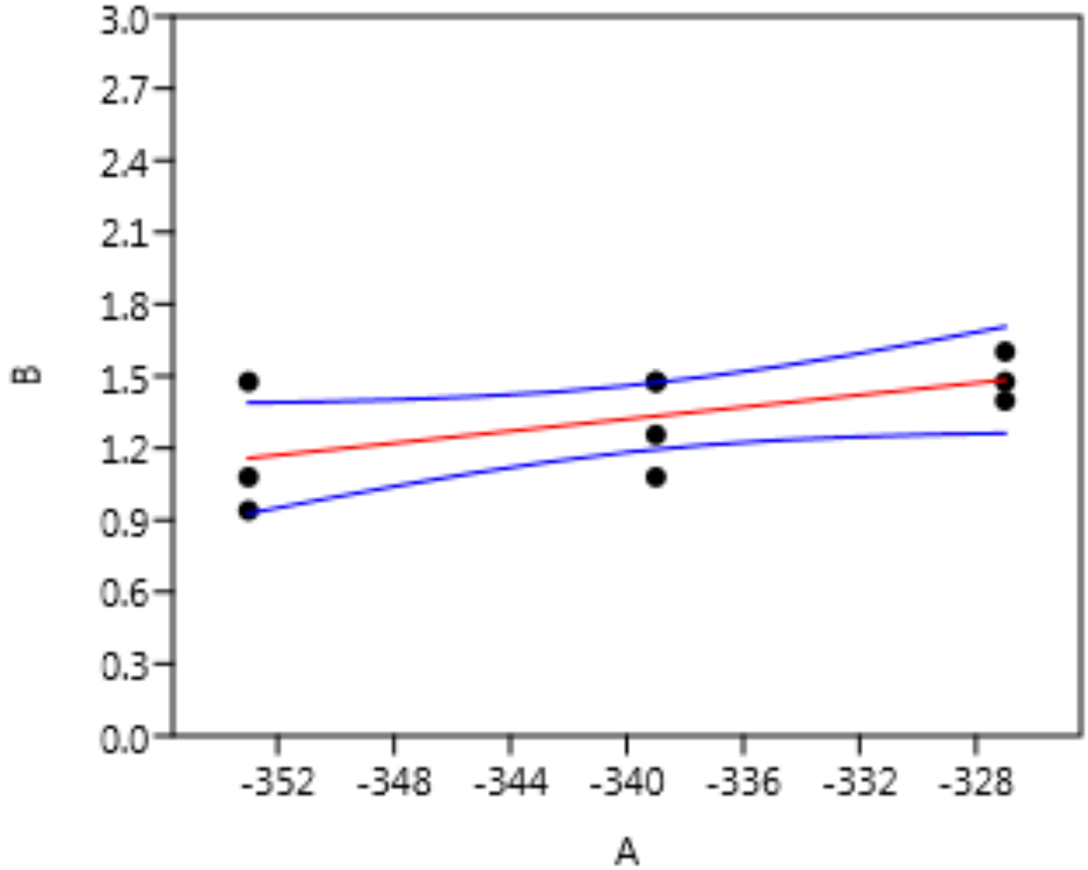

Fig. S76.

OLS regression: Mississippian Acanthodida ("Acanthodian") size/age. This regression did not produce a significant correlation (p=0.07 at a=0.05) but had a very large effect size (r=0.60; See Table S34 for metrics). This discrepancy is likely due to low sample size. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 1C.

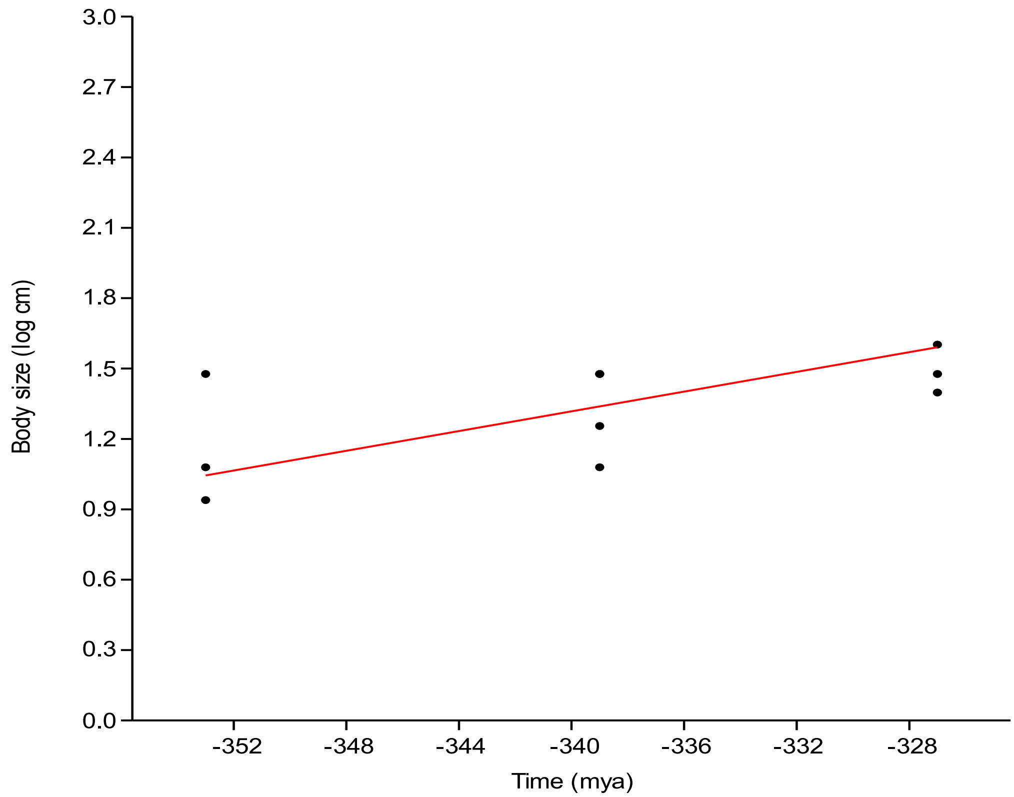

Fig. S77.

RMA regression: Mississippian Acanthodida ("Acanthodian") size/age. This regression did not produce a significant correlation (p=0.07 at a=0.05) but had a very large effect size (r=0.60; See Table S35 for metrics). This discrepancy is likely due to low sample size. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. S4C.

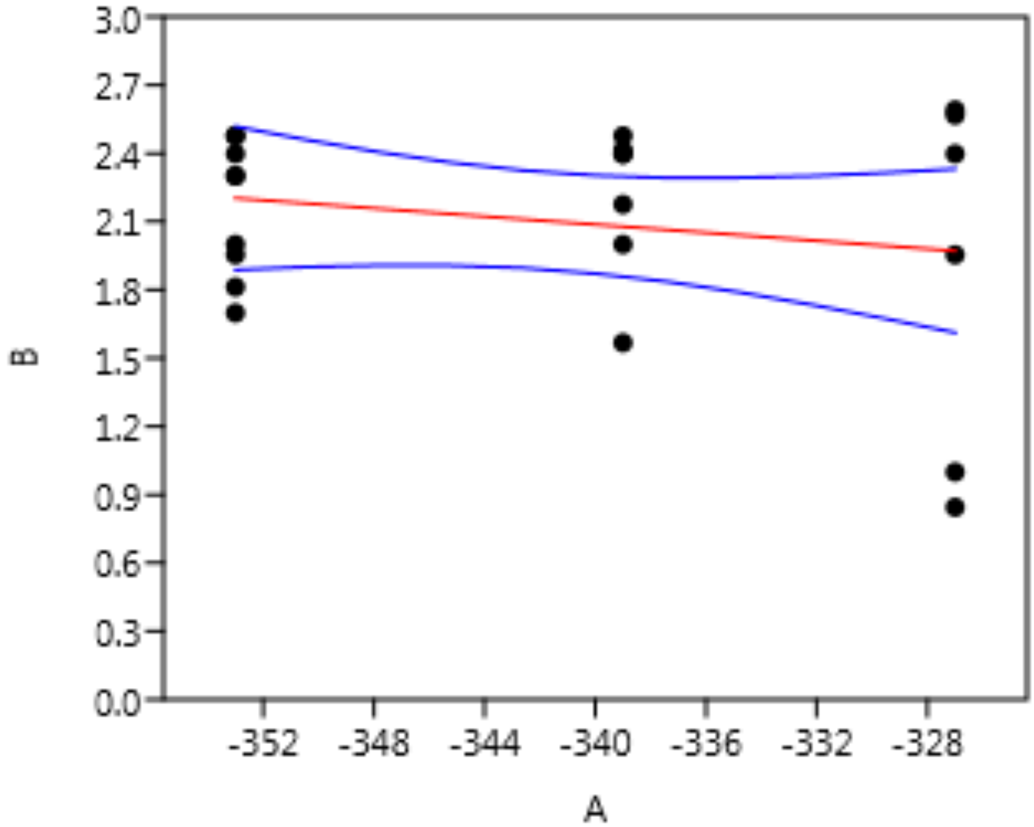

Fig. S78.

OLS regression: Mississippian Gyracanthida ("Acanthodian") size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S34 for metrics). This is likely due to the appearance of small spine-based species in the late Mississippian, which may be juveniles. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 1C.

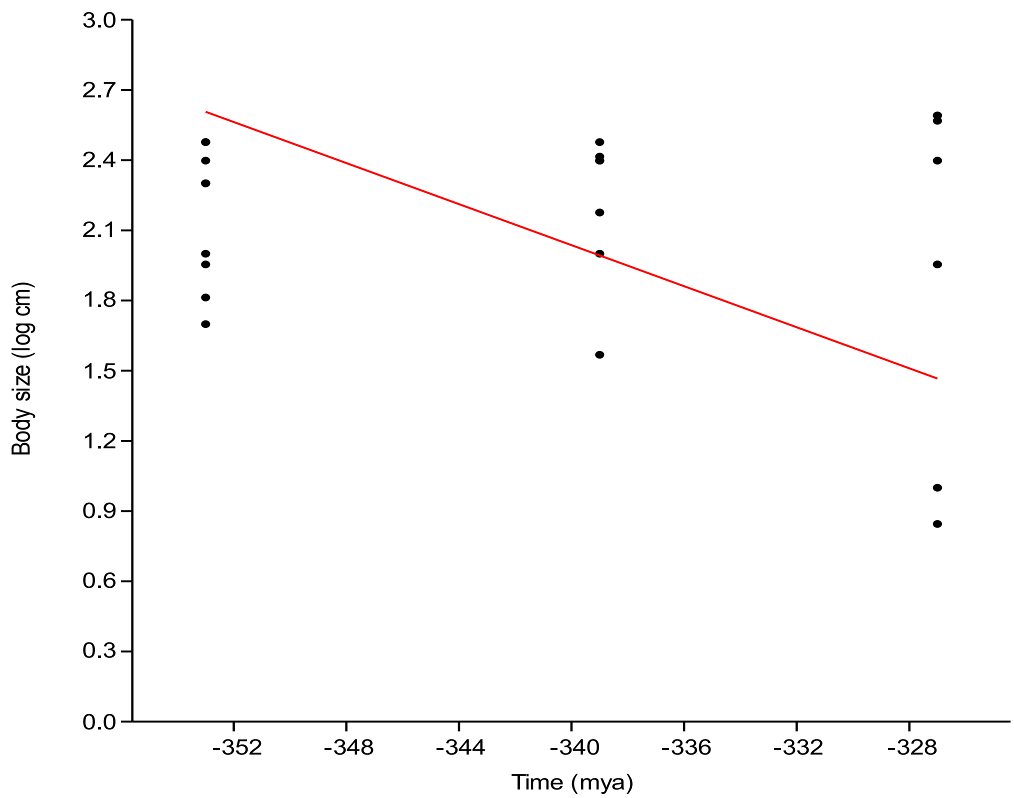

Fig. S79.

RMA regression: Mississippian Gyracanthida (“Acanthodian”) size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S35 for metrics). This is likely due to the appearance of small spine-based species in the late Mississippian, which may be juveniles. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. S4C.

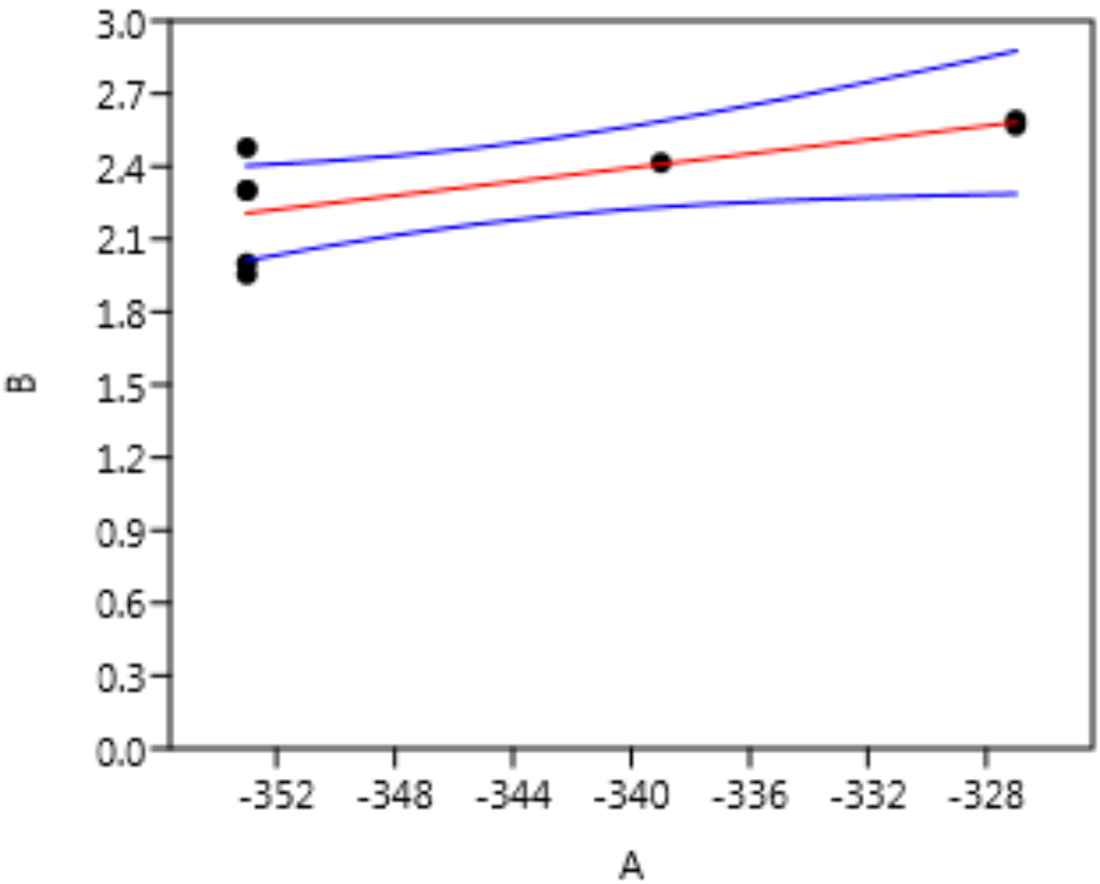

Fig. S80.
OLS regression: Mississippian *Gyracanthus* (Gyracanthida: "Acanthodian") size/age. See Table S34 for metrics.

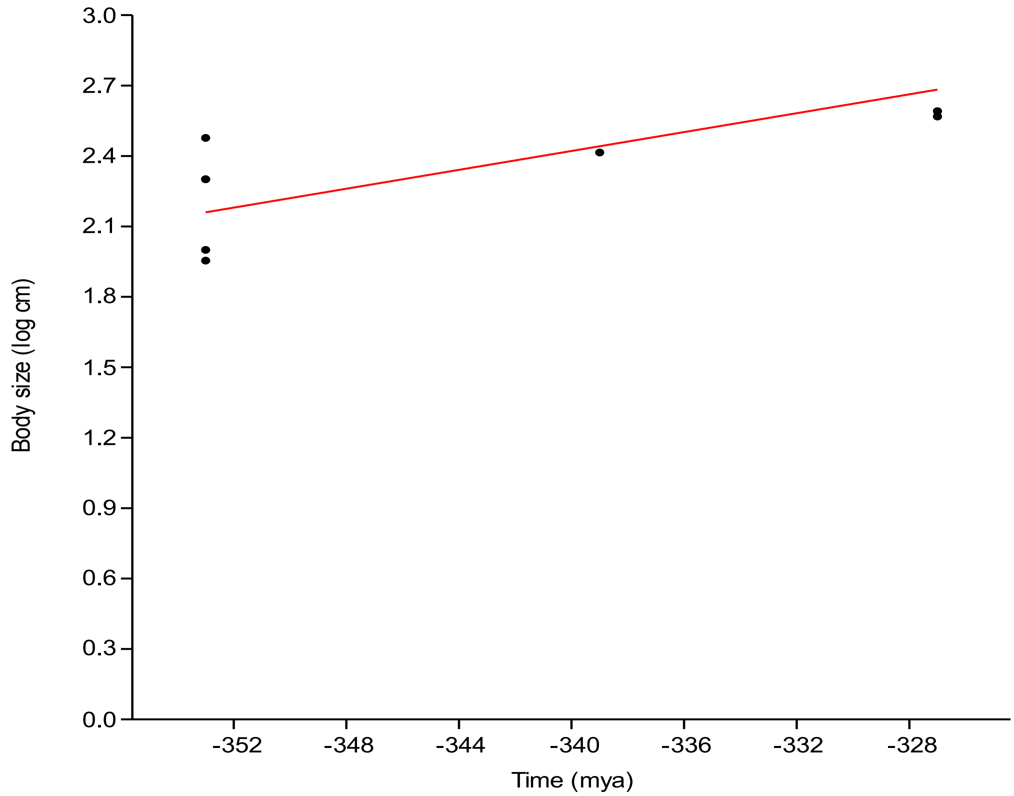

Fig. S81.
RMA regression: Mississippian *Gyracanthus* (Gyracanthida: "Acanthodian") size/age. See Table S35 for metrics.

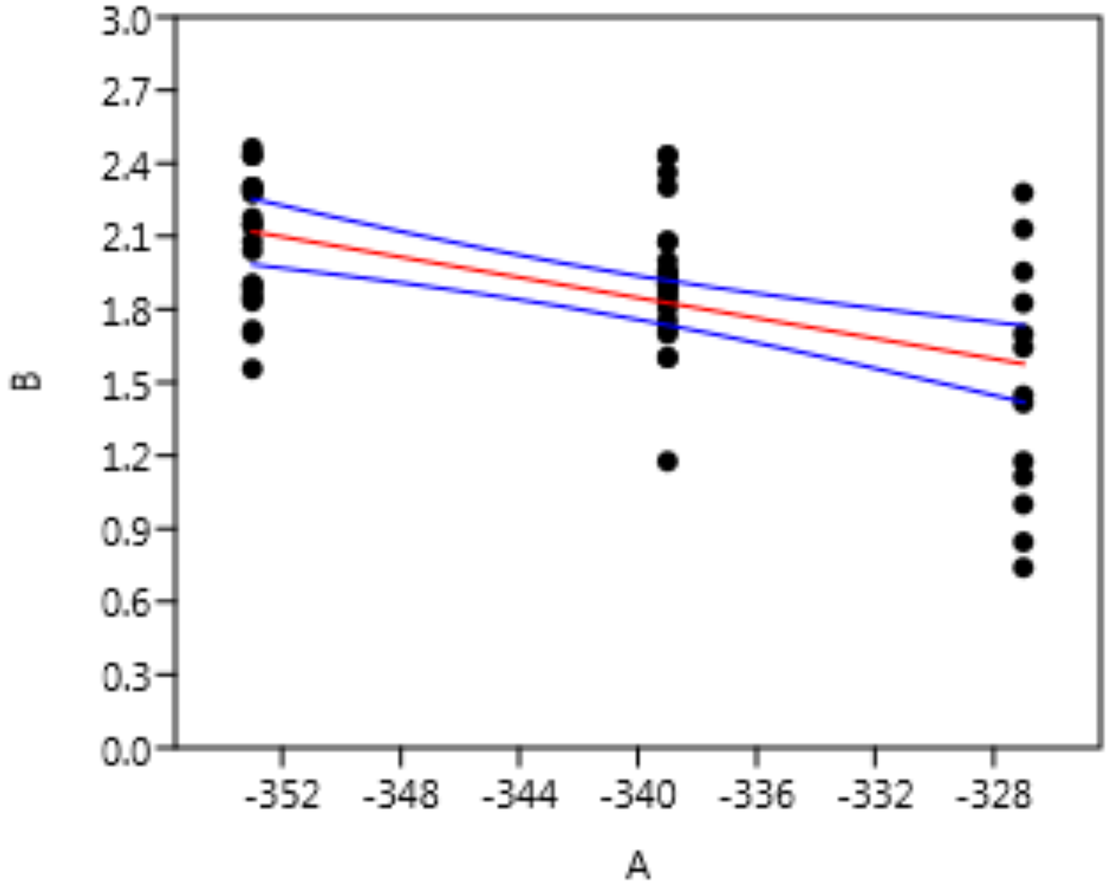

Fig. S82.
OLS regression: Mississippian Elasmobranchii (Chondrichthyes) size/age. See Table S34 for metrics.

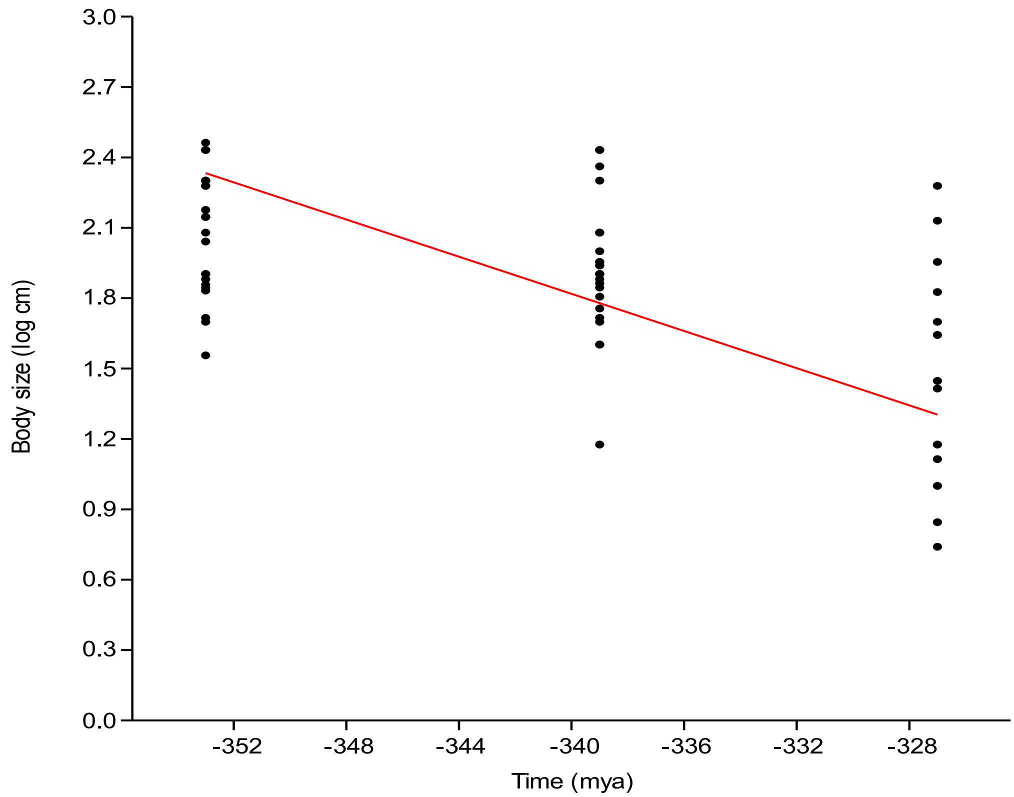

Fig. S83.

RMA regression: Mississippian Elasmobranchii (Chondrichthyes) size/age. See Table S35 for metrics.

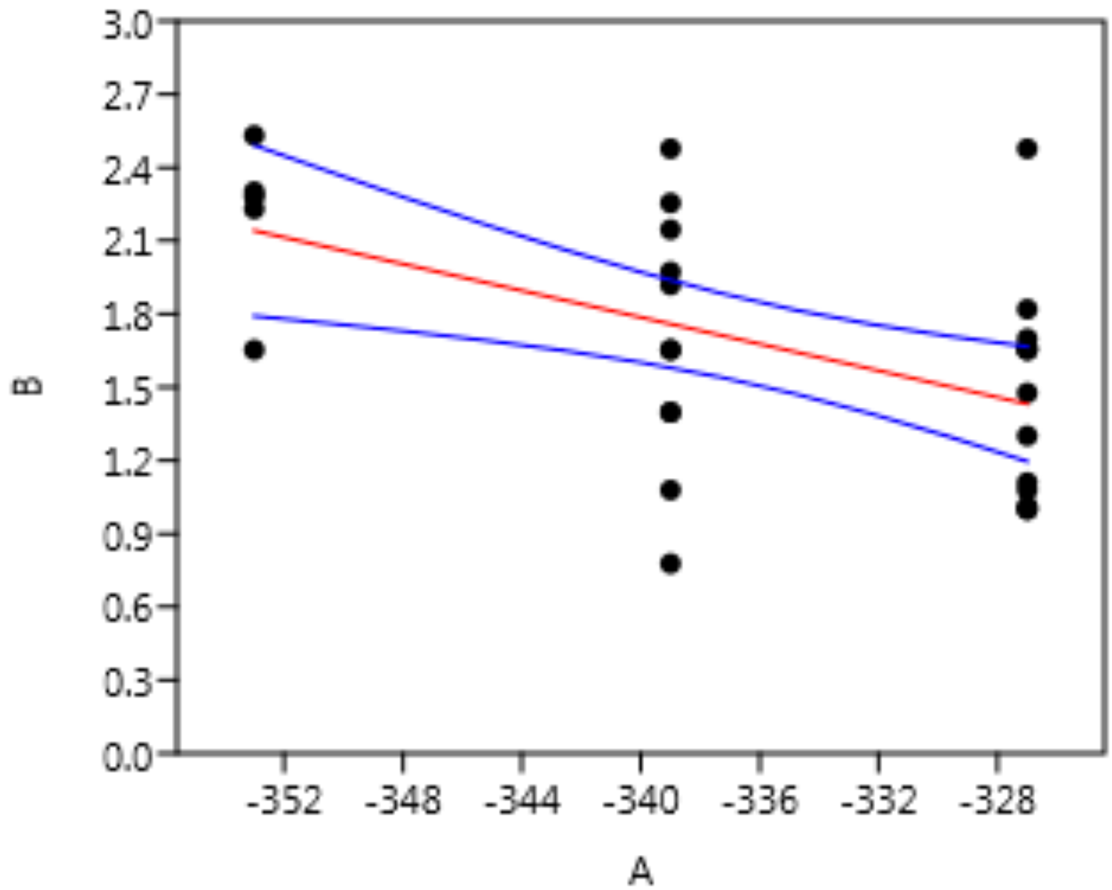

Fig. S84.
OLS regression: Mississippian Holocephali (Chondrichthyes) size/age. See Table S34 for metrics

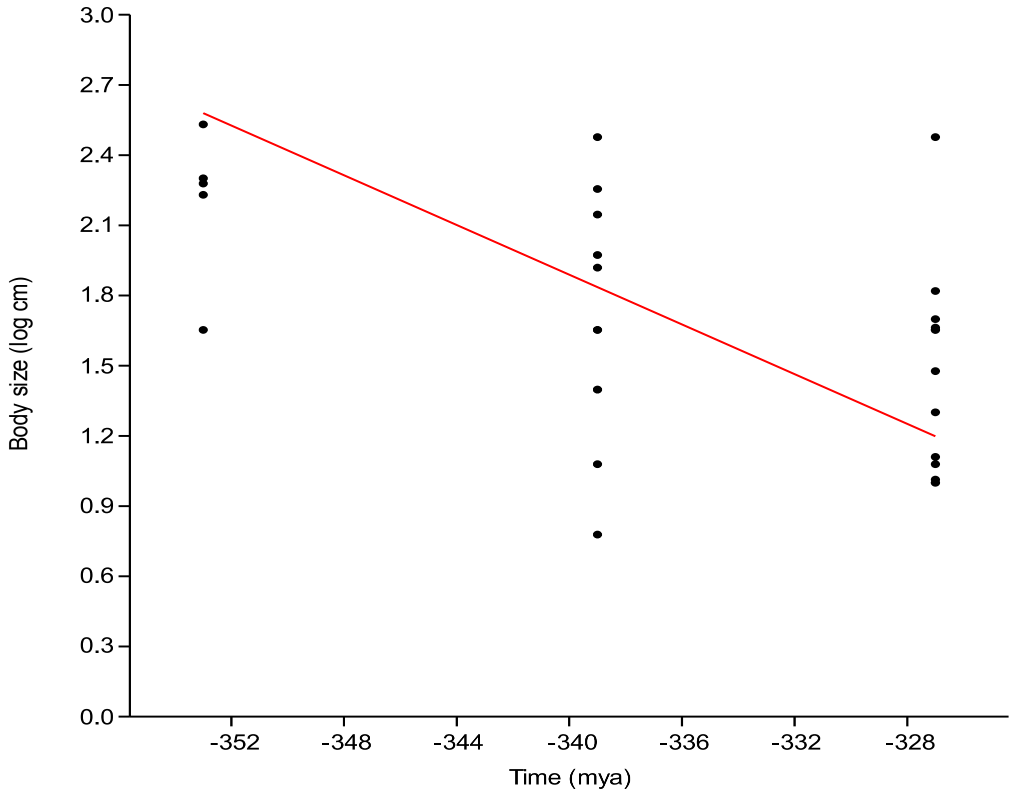

Fig. S85.
RMA regression: Mississippian Holocephali (Chondrichthyes) size/age. See Table S35 for metrics

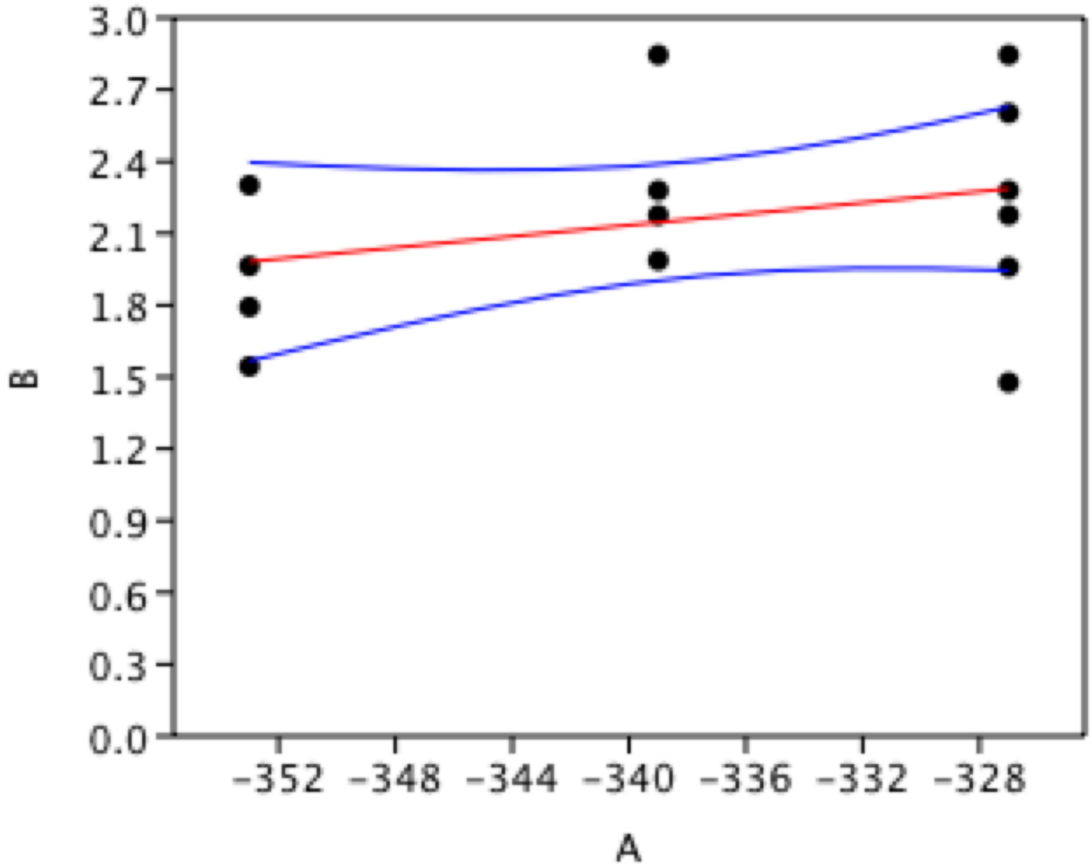

Fig. S86.

OLS regression: Mississippian Rhizodontida (Sarcopterygii) size/age. This regression did not produce a significant correlation but had a moderate effect size (r=0.31; See Table S36 for metrics). This discrepancy is likely due to low sample size. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 1C.

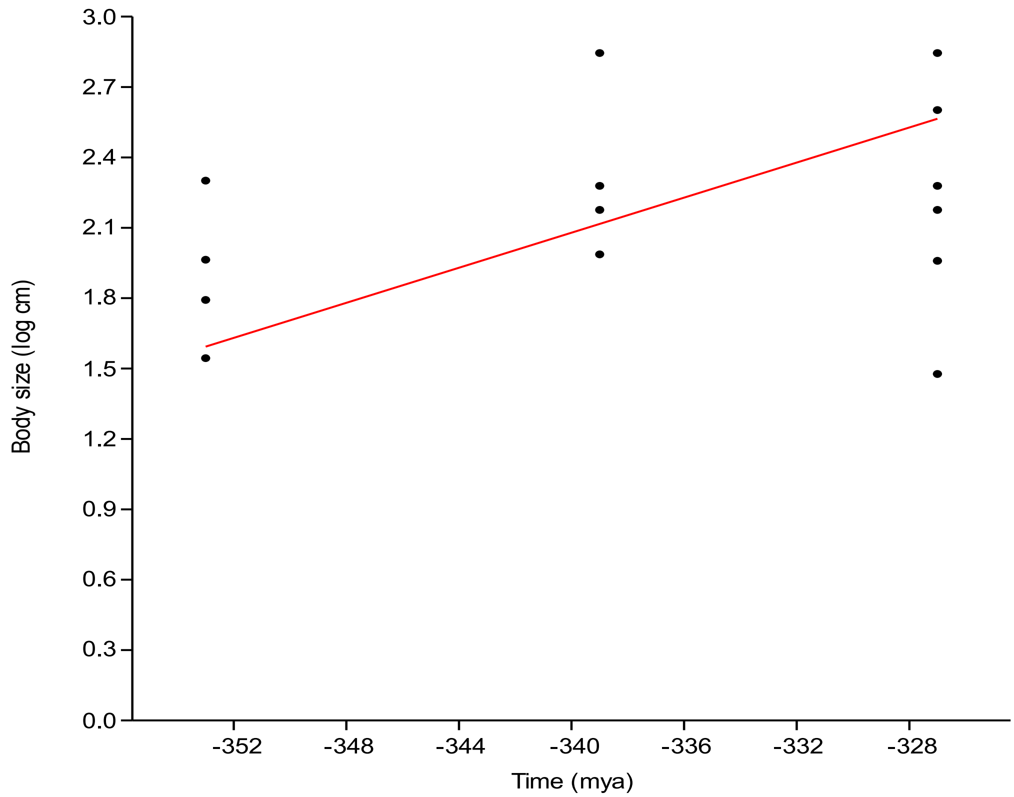

Fig. S87.

RMA regression: Mississippian Rhizodontida (Sarcopterygii) size/age. This regression did not produce a significant correlation but had a moderate effect size (r=0.31; See Table S37 for metrics). This discrepancy is likely due to low sample size. Therefore, the mean transformed body length for the Mississippian was plotted in Fig. S4C.

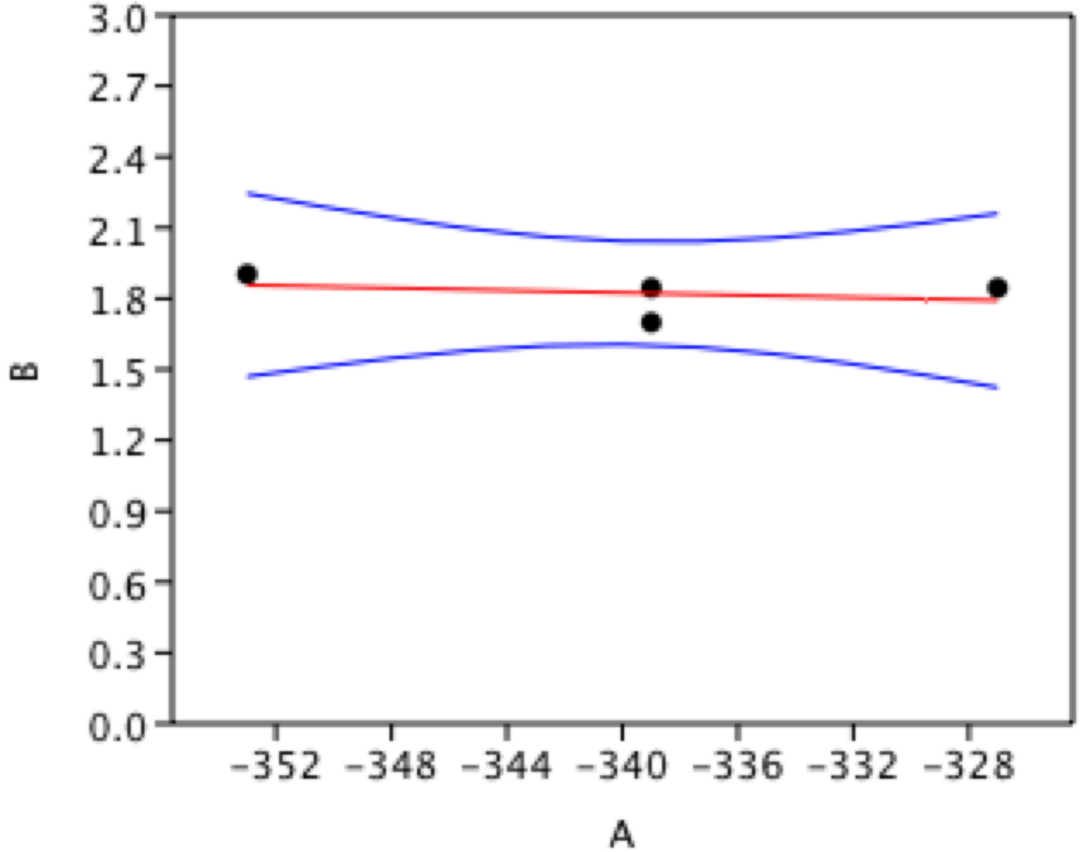

Fig. S88.

OLS regression: Mississippian Dipnoi (Sarcopterygii) size/age. While the sample size was only 4, Dipnoi were included because of their importance as a clade in the Devonian and strong microfossil record. Predictably, this regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S36 for metrics). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 1C.

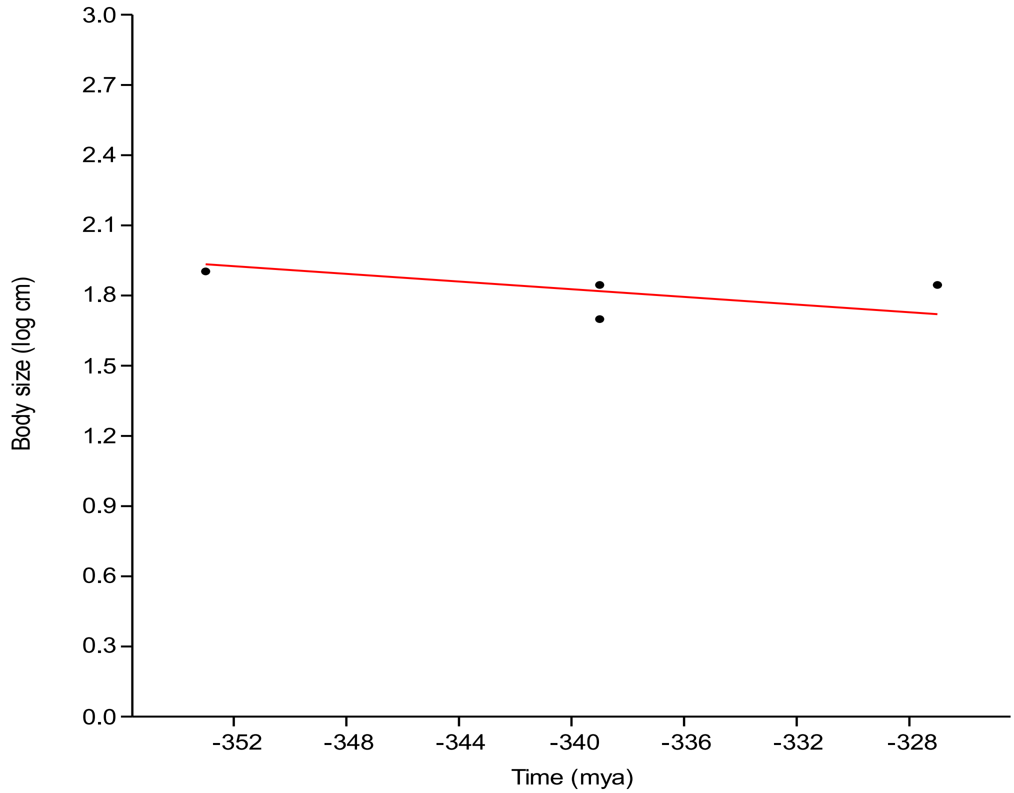

Fig. S89.

RMA regression: Mississippian Dipnoi (Sarcopterygii) size/age While the sample size was only four, Dipnoi were included because of their importance as a clade in the Devonian and strong microfossil record. Predictably, this regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S37 for metrics). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. S4C.

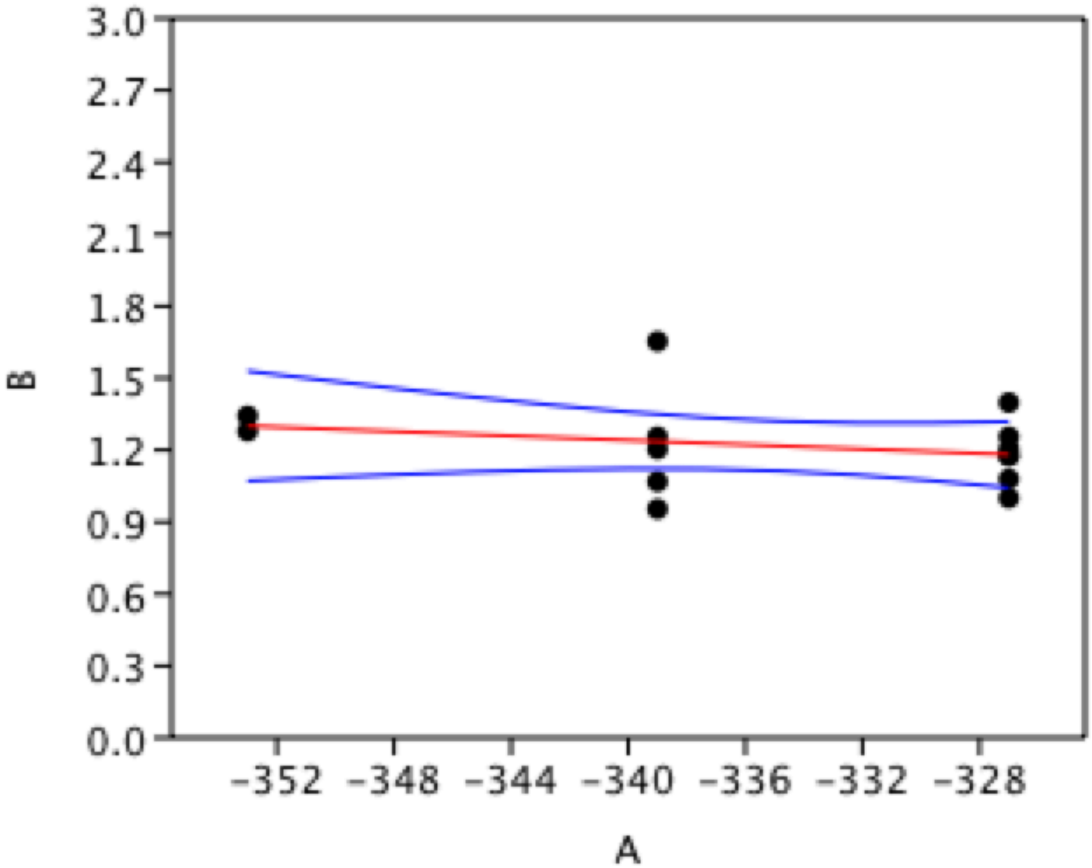

Fig. S90.

OLS regression: Mississippian Actinistia (Sarcopterygii) size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S36 for metrics). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 1C.

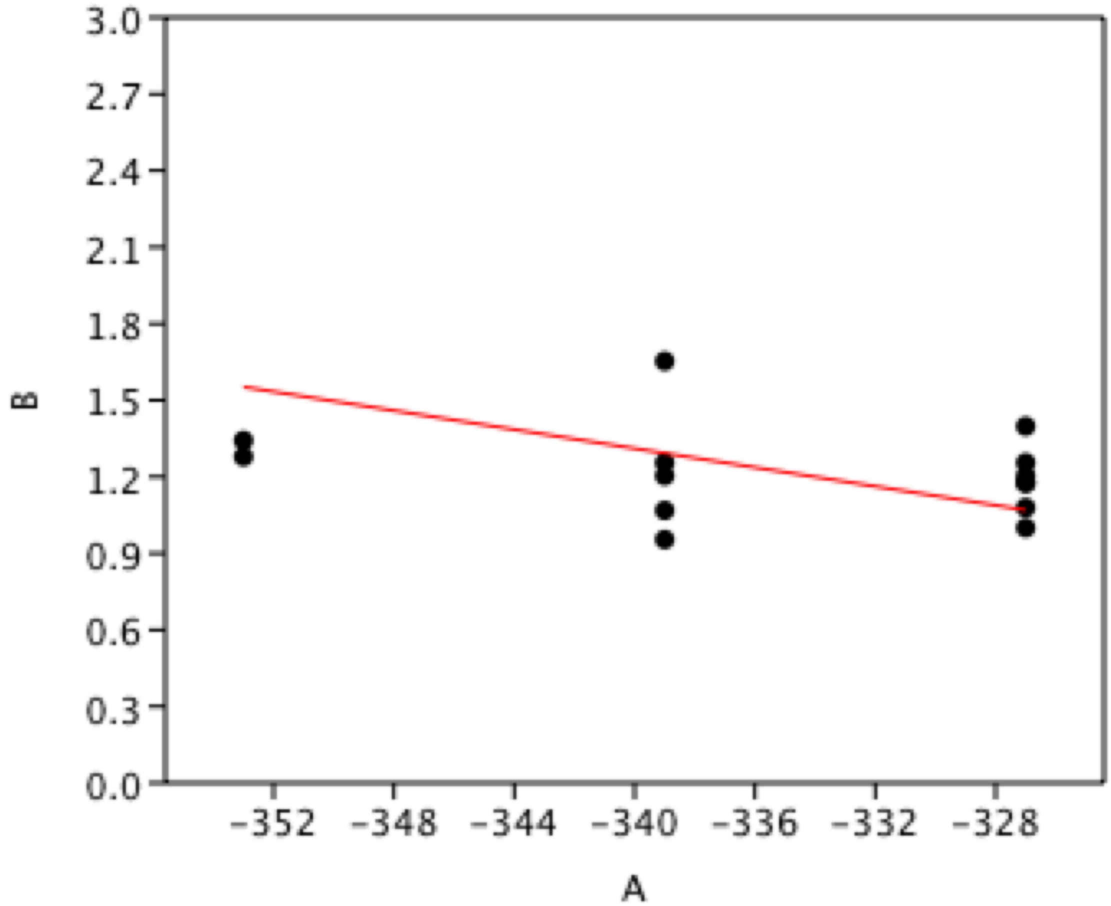

Fig. S91.

RMA regression: Mississippian Actinistia (Sarcopterygii) size/age. This regression did not produce a significant correlation, had a low effect size and the trend was not distinguishable from a flat line (See Table S37 for metrics). Therefore, the mean transformed body length for the Mississippian was plotted in Fig. 4SC.

Table S1.

Body lengths for all included occurrences. Asterisks indicate estimates.

Group	Subgroup	Genus	Species	Stage bin	Body size (cm)	Citation
Actinopterygii	NA	Dialipina	markae	Lochkovian-Emsian	6.3*	Basden & Young 2001
Actinopterygii	NA	Ligulalepis	toombsi	Emsian	7.3*	Basden & Young 2001
Actinopterygii	NA	Dialipina	salgueroensis	Emsian	12	Basden & Young 2001
Actinopterygii	NA	Cheirolepis	tralli	Eifelian-Givetian	25	Frickhinger 1991
Actinopterygii	NA	Moythomasia	striatus	Eifelian-Frasnian	15	Gross 1953
Actinopterygii	NA	Donnrosenia	schaefferi	Givetian	21	Long et al. 2008
Actinopterygii	NA	Howqualepis	rostridens	Givetian	50	Long 1988
Actinopterygii	NA	Howqualepis	youngorum	Givetian	14	Choo 2009
Actinopterygii	NA	Stegotrachelus	finlayi	Givetian-Frasnian	14.6	Swartz 2009
Actinopterygii	NA	Cheirolepis	canadensis	Frasnian	53	Whitheaves 1887
Actinopterygii	NA	Moythomasia	durgaringa	Frasnian	10	Daeschler 2000
Actinopterygii	NA	Moythomasia	nitida	Frasnian	15	Choo 2011
Actinopterygii	NA	Moythomasia	sp.	Frasnian	20	Choo 2011
Actinopterygii	NA	Mimipsicus	toombsi	Frasnian	20	Choo 2011
Actinopterygii	NA	Osorioichthys	marginis	Famennian	30*	Taverne 1997
Actinopterygii	NA	Krasnoyarichthys	jesseni	Famennian	10	Prokofiev 2002
Actinopterygii	NA	Limnomis	delaneyi	Famennian	6	Daeschler 2000
Actinopterygii	NA	Cuneognathus	gardineri	Famennian	12	Friedman & Blom 2006
Actinopterygii	NA	Tegeolepis	clarki	Famennian	100	Dunkle & Schaeffer 1973
Actinopterygii	NA	Kentuckia	hlavini	Famennian	10	Frickhinger 1991
Actinopterygii	NA	Gonatodus	brainerdi	Famennian	40	Newberry 1889
Actinopterygii	NA	Ganolepis	gracilis	Tournaisian	5	Woodward 1893
Actinopterygii	NA	Oxypteriscus	minimus	Tournaisian	5	Berg et al. 1967
Actinopterygii	NA	Senekichthys	hirundo	Tournaisian	10	Prokofiev 2004
Actinopterygii	NA	Ministrella	longicauda	Tournaisian	5	Berg et al. 1967
Actinopterygii	NA	Gyrolepitodus	sp.	Tournaisian	5	Berg et al. 1967
Actinopterygii	NA	Palaeobergia	microlepis	Tournaisian	12	Berg et al. 1967
Actinopterygii	NA	Mansfieldiscus	sweeti	Tournaisian	40	Long 1988
Actinopterygii	NA	Novogonatodus	kazantsevae	Tournaisian	20	Long 1988
Actinopterygii	NA	Aetheretmon	valentiacum	Tournaisian	12	Smithson et al. 2012
Actinopterygii	NA	Strepheoschema	fouldenensis	Tournaisian	16	Gardiner, 1985
Actinopterygii	NA	Fouldenia	ischyptera	Tournaisian	12	Sallan and Coates, 2014
Actinopterygii	NA	Phanerosteon	ovensi	Tournaisian	9	Smithson et al. 2012
Actinopterygii	NA	Cosmoptychius	striatus	Tournaisian-Visean	26	Traquair 1877
Actinopterygii	NA	Rhadinichthys	alberti	Tournaisian	9	Lambe 1910
Actinopterygii	NA	Acrolepis	hortonensis	Tournaisian	30*	Lambe 1910
Actinopterygii	NA	Elonichthys	browni	Tournaisian	11	Hussakof & Bryant 1918
Actinopterygii	NA	Mansfieldiscus?	gibbus	Tournaisian	10	Long 1988
Actinopterygii	NA	Kentuckia	deani	Tournaisian	13*	Berg et al. 1967

Actinopterygii	NA	Benedenius	deenensis	Visean	29	Boulenger 1899
Actinopterygii	NA	Adroichthys	tuberculatus	Visean	10	Gardiner 1969
Actinopterygii	NA	Mentzichthys	jubbi	Visean	40	Gardiner 1969
Actinopterygii	NA	Mentzichthys	maraisi	Visean	18	Gardiner 1969
Actinopterygii	NA	Mentzichthys	theroni	Visean	12	Gardiner 1969
Actinopterygii	NA	Aestaurichthys	fulcratus	Visean	10.5	Gardiner 1969
Actinopterygii	NA	Soetendalichthys	cromptoni	Visean	21	Gardiner 1969
Actinopterygii	NA	Australichthys	longidorsalis	Visean	15	Gardiner 1969
Actinopterygii	NA	Willomorichthys	striatulus	Visean	25	Gardiner 1969
Actinopterygii	NA	Sundayichthys	cromptoni	Visean	10	Gardiner 1969
Actinopterygii	NA	Dwykia	anaensis	Visean	12	Gardiner 1969
Actinopterygii	NA	Tarrasius	problematicus	Visean	9	Sallan 2012
Actinopterygii	NA	Holurus	parki	Visean	12	Berg et al. 1967
Actinopterygii	NA	Mesopoma	politum	Visean	7	Frickhinger 1991
Actinopterygii	NA	Mesopoma	pulchellum	Visean	8	Frickhinger 1991
Actinopterygii	NA	Mesopoma	crassum	Visean	15	Moy-Thomas 1934
Actinopterygii	NA	Canobius	ramseyi	Visean	12	Frickhinger 1991
Actinopterygii	NA	Styracopterus	fulcratus	Visean	16	Sallan and Coates, 2014
Actinopterygii	NA	Canobius	elegantulus	Visean	7	Moy-Thomas 1934
Actinopterygii	NA	Paramesolepis	rhombus	Visean	13	Sallan and Coates, 2014
Actinopterygii	NA	Paramesolepis	tuberculata	Visean	13	Sallan and Coates, 2014
Actinopterygii	NA	Rhadinichthys	canobiensis	Visean	12	Moy-Thomas 1934
Actinopterygii	NA	Proteurynotus	sp.	Visean	16	Sallan and Coates, 2014
Actinopterygii	NA	Rhadinichthys	carinatus	Visean	11	Traquair 1907
Actinopterygii	NA	Wardichthys	cyclosoma	Visean	11	Sallan and Coates, 2014
Actinopterygii	NA	Rhadinichthys	elegantulus	Visean	4.5	Berg et al. 1967
Actinopterygii	NA	Rhadinichthys	fusiformis	Visean	11	Frickhinger 1991
Actinopterygii	NA	Rhadinichthys	ornatissmus	Visean	25	Hussakof & Bryant 1918
Actinopterygii	NA	Cycloptychius	concentricus	Visean	12	Berg et al. 1967
Actinopterygii	NA	Elonichthys	serratus	Visean	12	Traquair 1881
Actinopterygii	NA	Elonichthys	striatulus	Visean	6	Traquair 1881
Actinopterygii	NA	Elonichthys	robisoni	Visean-Serpukhovian	10	Traquair 1881
Actinopterygii	NA	Acrolepis	ortholepis	Visean	30	Frickhinger 1991
Actinopterygii	NA	Cherodopsis	geikei	Visean	9	Frickhinger 1991
Actinopterygii	NA	Nematoptychius	greenocki	Visean-Serpukhovian	45	Frickhinger 1991
Actinopterygii	NA	Platysomus	superbus	Visean	18	Moy-Thomas 1934
Actinopterygii	NA	Gonatodus	punctatus	Visean	5	Traquair 1907
Actinopterygii	NA	Eurynotus	crenatus	Visean-Serpukhovian	17	Frickhinger 1991
Actinopterygii	NA	Drydenius	insignius	Visean-Serpukhovian	10	Frickhinger 1991
Actinopterygii	NA	Phanerosteon	mirabile	Visean	14	Moy-Thomas and Miles 1971
Actinopterygii	NA	Mesolepis	sp.	Visean	20	Photo
Actinopterygii	NA	Amphicentrum	crassum	Visean-Serpukhovian	30	Sallan and Coates, 2014

Actinopterygii	NA	Frederichthys	musadentatis	Serpukhovian	5.7	Coates 1993
Actinopterygii	NA	Mesopoma	carricki	Serpukhovian	7	Coates 1993
Actinopterygii	NA	Mesopoma	smithsoni	Serpukhovian	8	Coates 1993
Actinopterygii	NA	Mesopoma	pancheni	Serpukhovian	5.5	Coates 1993
Actinopterygii	NA	Mesopoma	planti	Serpukhovian	6	Coates 1999
Actinopterygii	NA	Woodichthys	sp.	Serpukhovian	11	Photo
Actinopterygii	NA	Melanecta	anneae	Serpukhovian	5	Coates 1993
Actinopterygii	NA	Paratarrasius	hibbardi	Serpukhovian	13.6	Lund & Melton 1982
Actinopterygii	NA	Aesopichthys	erinaceus	Serpukhovian	9	Poplin & Lund 2000
Actinopterygii	NA	Proceramala	montanensis	Serpukhovian	10	Poplin & Lund 2000
Actinopterygii	NA	Cyranorhis	bergeraci	Serpukhovian	15	Lund & Poplin 1997
Actinopterygii	NA	Kalops	monophrys	Serpukhovian	11.6	Poplin & Lund 2002
Actinopterygii	NA	Kalops	diophrys	Serpukhovian	9.6	Poplin & Lund 2002
Actinopterygii	NA	Discoserra	pectinodon	Serpukhovian	6	Lund 2000
Actinopterygii	NA	Guildayichthys	carnegiei	Serpukhovian	6	Lund 2000
Actinopterygii	NA	Wendyichthys	dicksoni	Serpukhovian	12	Lund & Poplin 1997
Actinopterygii	NA	Wendyichthys	lautreci	Serpukhovian	11	Lund & Poplin 1997
Actinopterygii	NA	Yogoniscus	gulo	Serpukhovian	27	Frickhinger 1991
Actinopterygii	NA	Rhadinichthys	monensis	Serpukhovian	9	Wellburn 1900
Actinopterygii	NA	Tanypterichthys	pridensis	Serpukhovian	50	Weems & Windolph 1986
Actinopterygii	NA	Cryphiolepis	striatus	Serpukhovian	12	Traquair 1881
Actinopterygii	NA	Fubarichthys	copiosus	Serpukhovian	10	Lowney, 1980
Actinopterygii	NA	Apholidotus	ossna	Serpukhovian	8	Frickhinger 1991
Actinopterygii	NA	Elonichthys	obliquuis	Serpukhovian	15	Wellburn 1903
Actinopterygii	NA	Lineagruan	judithi	Serpukhovian	9.5	Mickle et al. 2009
Actinopterygii	NA	Lineagruan	snowyi	Serpukhovian	12.3	Mickle et al. 2009
Actinopterygii	NA	Beagiascus	pulcherrimus	Serpukhovian	10	Mickle et al. 2009
Actinopterygii	NA	Atracauda	lundi	Serpukhovian	13	Frickhinger 1991
Actinopterygii	NA	Bourbonella	jocelynae	Serpukhovian	3	Mickle 2011
Actinopterygii	NA	Guntherichthys	lehiensis	Serpukhovian	7.5	Mickle 2011
Actinopterygii	NA	Spinofacia	pectinatus	Serpukhovian	10	Mickle 2011
Actinopterygii	NA	Prohapolepis	scotica	Serpukhovian	4	Lowney 1983
Actinopterygii	NA	Blairolepis	loanheadensis	Serpukhovian	4.5*	Lowney 1983
Acanthodii	Acanthodida	Promesacanthus	eppleri	Lochkovian	3	Hanke 2008a
Acanthodii	Climatiida	Gladiobranchus	probaton	Lochkovian	11	Hanke 2008b
Acanthodii	Climatiida	Cassidiceps	vermiculatus	Lochkovian	6.7	Gagnier &

							Wilson 1996
Acanthodii	NA	Brochoadmones	milesi	Lochkovian		14	Denison 1979
Acanthodii	Climatiida	Lupopsyrus	pygmaeus	Lochkovian		5.5	Denison 1979
Acanthodii	NA	Paucicanthus	vanelsti	Lochkovian		3.8	Hanke 2002
Acanthodii	Climatiida	Tetanopsyrus	lindoei	Lochkovian		3.7	Hanke et al. 2001
Acanthodii	Climatiida	Tetanopsyrus	breviacanthus	Lochkovian		4	Hanke et al. 2001
Acanthodii	Ishnacanthida	Machaeracanthus	bohemicus	Lochkovian-Emsian		200	Denison 1979
Acanthodii	Climatiida	Ptomacanthus	anglicus	Lochkovian		30	Denison 1979
Acanthodii	Climatiida	Vernicomacanthus	waynensis	Lochkovian		15	Denison 1979
Acanthodii	Climatiida	Uraniacanthus	spinosus	Lochkovian		15	Denison 1979
Acanthodii	Ishnacanthida	Onchus	besomensis	Lochhovian	30*		White 1962
Acanthodii	Ishnacanthida	Onchus	wheathillensis	Lochkovian	50*		White 1962
Acanthodii	Climatiida	Bradyacanthus	scutiger	Lochkovian		7	Denison 1979
Acanthodii	Climatiida	Climatius	reticulatus	Lochkovian		14	Frickhinger 1991
Acanthodii	Climatiida	Euthacanthus	macnicoli	Lochkovian		14	Frickhinger 1991
Acanthodii	Ishnacanthida	Ishnacanthus	gracilis	Lochkovian		16	Denison 1979
Acanthodii	Acanthodida	Mesacanthus	mitchelli	Lochkovian		6	Frickhinger 1991
Acanthodii	NA	Podoliacanthus	zychi	Lochkovian-Pragian		16	Voichyshyn & Szaniawski 2012
Acanthodii	Climatiida	Acritolepis	ushakovi	Lochkovian		8	Valiukevius, 2003b
Acanthodii	Climatiida	Acritolepis	urvantsevi	Lochkovian	12*		Valiukevius, 2003b
Acanthodii	Ishnacanthida	Poracanthodes	punctatus	Lochkovian-Pragian	20*		Valiukevius, 2003b
Acanthodii	Ishnacanthida	Acanthophora	transitans	Lochkovian		7.5	Valiukevius, 2003b
Acanthodii	NA	Sinacanthus	wuchangensis	Lochkovian-Givetian	47*		Maisley & Janvier 2011
Acanthodii	NA	Sinacanthus	sp.	Lochkovian	27*		Maisley & Janvier 2011
Acanthodii	Climatiida	Parexus	incurvus	Lochkovian		7.5	Noyitskava & Obruchev 1967
Acanthodii	Ishnacanthida	Machaeracanthus	goujeti	Pragian	30*		Botella et al. 2012
Acanthodii	Ishnacanthida	Machaeracanthus	hunsrueckianum	Pragian-Emsian	150*		Sudkamp and Burrow, 2007
Acanthodii	Ishnacanthida	Machaeracanthus	peracutus	Pragian-Emsian	81*		Newberry 1889
Acanthodii	Ishnacanthida	Machaeracanthus	sulcatus	Pragian-Givetian	110*		Newberry 1889
Acanthodii	Climatiida	Undichna	septesmsulcata	Pragian		34	Wisshak et al. 2004
Acanthodii	Climatiida	Bryantonchus	peracutus	Pragian-Emsian	31*		Burrow 2007
Acanthodii	Ishnacanthida	Machaeracanthus	sp.	Emsian	140*		Sudkamp and Burrow, 2007
Acanthodii	Ishnacanthida	Taemasacanthus	erroli	Emsian	28*		Long 1986
Acanthodii	Ishnacanthida	Taemasacanthus	porca	Emsian	9.3*		Lindley 2000
Acanthodii	Ishnacanthida	Taemasacanthus	cooradigbeensis	Emsian	14*		Lindley 2002
Acanthodii	Ishnacanthida	Taemasacanthus	narrengullensis	Emsian	22*		Lindley 2002
Acanthodii	Ishnacanthida	Cavanacanthus	warrooensis	Emsian	16*		Lindley 2000
Acanthodii	Ishnacanthida	Cambaracanthus	comptus	Emsian	11*		Lindley 2000
Acanthodii	Climatiida	Sevyacanthus	elliotti	Emsian	24*		Burrow 2007
Acanthodii	Climatiida	Climatius	latispinosus	Emsian	54*		Burrow 2007
Acanthodii	Climatiida	Nodocosta	denisoni	Emsian	15*		Burrow 2007
Acanthodii	Ishnacanthida	Ishnacanthus	sp.	Emsian	31*		Burrow 2007

Acanthodii	Ishnacanthida	Cacheacanthus	utahensis	Emsian	32*	Burrow 2007
Acanthodii	Ishnacanthida	Melanocanthus	minutus	Emsian	2	Cumbaa & Schultze 2002
Acanthodii	Climatiida	Diplacanthus	striatus	Eifelian-Givetian	10	Denison 1979
Acanthodii	Climatiida	Diplacanthus	tenuistriatus	Eifelian-Givetian	19	Denison 1979
Acanthodii	Gyracanthida	Gyracanthides	sp.1	Eifelian	150	Long 2011
Acanthodii	Gyracanthida	Gyracanthides	sp.2	Eifelian	110*	Warren et al. 2000
Acanthodii	Gyracanthida	Gyracanthus	sp.	Eifelian	50*	Blieck et al., 1980
Acanthodii	Climatiida	Rhadinacanthus	longispinus	Eifelian-Givetian	16	Frickhinger 1991
Acanthodii	Acanthodida	Cheiracanthus	murchisoni	Eifelian-Givetian	30	Denison 1979
Acanthodii	Acanthodida	Cheiracanthus	latus	Eifelian-Givetian	19	Denison 1979
Acanthodii	Ishnacanthida	Atopacanthus	pecularis	Eifelian	52*	Burrow 2004
Acanthodii	Ishnacanthida	Atopacanthus	ambrockensis	Eifelian	17*	Otto 1999
Acanthodii	Acanthodida	Mesacanthus	peachi	Eifelian-Givetian	6	Denison 1979
Acanthodii	Acanthodida	Haplacanthus	marginalis	Givetian	28*	Noyitskava & Obruchev 1967
Acanthodii	Acanthodida	Homacanthus	gracilis	Givetian	8.2*	Noyitskava & Obruchev 1967
Acanthodii	Ishnacanthida	Machaeracanthus	longaevus	Givetian	16*	Reed 1986
Acanthodii	Ishnacanthida	Machaeracanthus	major	Givetian	260*	Newberry 1889
Acanthodii	Climatiida	Nodocosta	pauli	Givetian	16*	Denison 1979
Acanthodii	Climatiida	Diplacanthus	longispinus	Givetian	22	Denison 1979
Acanthodii	Climatiida	Antarctonchus	glacialis	Givetian-Frasnian	80*	Denison 1979
Acanthodii	Gyracanthida	Gyracanthides	warreni	Givetian-Famennian	50*	Blieck et al. 1980
Acanthodii	Climatiida	Culmacanthus	antarctica	Givetian	21*	Young 1989
Acanthodii	Climatiida	Culmacanthus	pambulensis	Givetian-Frasnian	14*	Young 1989
Acanthodii	NA	Archaecanthus	quadrisulcatus	Givetian	60*	Denison 1979
Acanthodii	Climatiida	Milesacanthus	antarctica	Givetian	22	Young & Burrow 2004
Acanthodii	Ishnacanthida	Howittacanthus	kentoni	Givetian	19	Long 1986
Acanthodii	Acanthodida	Lodeacanthus	guajicas	Givetian	3.12	Upniece 2001
Acanthodii	Acanthodida	Oracanthus	sp.	Givetian	220*	Denison 1979
Acanthodii	Ishnacanthida	Persacanthus	simpsoniensis	Givetian-Frasnian	34*	Reed 1986
Acanthodii	Ishnacanthida	Apateacanthus	vestustus	Frasnian	31*	Burrow 2004
Acanthodii	Ishnacanthida	Atopacanthus	dentatus	Frasnian	31*	Burrow 2004
Acanthodii	Climatiida	Culmacanthus	stewartii	Frasnian	14	Young 1989
Acanthodii	Ishnacanthida	Machaeracanthus	sp.	Frasnian	16*	Reed 1986
Acanthodii	Ishnacanthida	Machaeracanthus	restustus	Frasnian	55*	Wells 1940
Acanthodii	Climatiida	Diplacanthus	horridus	Frasnian	12	Denison 1979
Acanthodii	Acanthodida	Triazeugacanthus	affinus	Frasnian	3	Frickhinger 1991
Acanthodii	Acanthodida	Homalacanthus	concinnus	Frasnian	8	Frickhinger 1991
Acanthodii	Gyracanthida	Gyracanthus	sarlei	Frasnian	51*	Hussakof & Bryant 1918
Acanthodii	Climatiida	Florestacanthus	morenoi	Frasnian	56*	Burrow et al. 2003
Acanthodii	Climatiida	Cosmacanthus	malcomsoni	Frasnian	34*	Noyitskava & Obruchev 1967
Acanthodii	Ishnacanthida	Onchus	latus	Famennian	4	Derycke & Clement 2002
Acanthodii	Gyracanthida	Gyracanthus	sherwoodi	Famennian	90*	Newberry 1889

Acanthodii	Climatiida	Diplacanthus	acus	Famennian		10	Gess 2001
Acanthodii	Acanthodida	Devononchus	tenusipinus	Famennian		4	Derycke & Clement 2002
Acanthodii	Ishnacanthida	Grenfellacanthus	zerinae	Famennian	76*		Long et al. 2004
Acanthodii	Acanthodida	Acanthodes	lopatini	Famennian-Tournaisian		12	Beznosov 2009
Acanthodii	Acanthodida	Acanthodes	dublinensis	Famennian		30	Denison 1979
Acanthodii	Acanthodida	Acanthodes	ovensis	Tournaisian		8.7	Dineley 1999
Acanthodii	Acanthodida	Acanthodes	australis	Tournaisian		30	Beznosov 2009
Acanthodii	Gyracanthida	Gyracanthus	falciformis	Tournaisian	90*		Wells 1943
Acanthodii	Gyracanthida	Gyracanthus	compressus	Tournaisian	200*		McCoy 1854
Acanthodii	Gyracanthida	Gyracanthus	alleni	Tournaisian	100*		Newberry et al. 1870
Acanthodii	Gyracanthida	Gyracanthus	magnificus	Tournaisian	300*		Traquair 1902
Acanthodii	Gyracanthida	Gyracanthus	obliquus	Tournaisian	200*		Traquair 1902
Acanthodii	Gyracanthida	Gyracanthides	murrayi	Tournaisian		50	Denison 1979
Acanthodii	Gyracanthida	Oracanthus	milleri	Tournaisian-Serpukhovian	250*		Denison 1979
Acanthodii	Gyracanthida	Oracanthus	pustulosus	Tournaisian		65	Patterson 1965
Acanthodii	Gyracanthida	Antacanthus	insignis	Tournaisian-Visean	300*		Denison 1979
Acanthodii	Acanthodida	Acanthodes	nitidus	Visean		30	Watson 1937
Acanthodii	Gyracanthida	Gyracanthides	hawkinsi	Visean		100	Turner et al. 2005
Acanthodii	Acanthodida	Homacanthus	macrodus	Visean	12*		McCoy 1848
Acanthodii	Acanthodida	Homacanthus	microdus	Visean	18*		McCoy 1848
Acanthodii	Gyracanthida	Oracanthus	triangularis	Visean	150*		Denison 1979
Acanthodii	Gyracanthida	Oracanthus	vetustus	Visean	250*		Leidy 1856
Acanthodii	Gyracanthida	Gyracanthus	rectus	Visean	260*		Wells 1943
Acanthodii	Gyracanthida	Acanthodopsis	russelli	Visean	37*		Burrow 2004
Acanthodii	Acanthodida	Acanthodes	sulcatus	Visean-Serpukhovian		30	Watson 1937
Acanthodii	Acanthodida	Acanthodes	lundi	Serpukhovian		40	Zidek 1980
Acanthodii	Acanthodida	Acanthodes	wardi	Serpukhovian		25	Denison 1979
Acanthodii	Gyracanthida	Aganacanthus	striatulus	Serpukhovian	90*		Denison 1979
Acanthodii	Gyracanthida	Gyracanthus	youngi	Serpukhovian	370*		Traquair 1884
Acanthodii	Gyracanthida	Gyracanthus	nobilis	Serpukhovian	190*		Traquair 1884
Acanthodii	Gyracanthida	Marsdenius	sumiti	Serpukhovian		10	Denison 1979
Acanthodii	Gyracanthida	Marsdenius	acuta	Serpukhovian		7	Denison 1979
Agnatha	Heterostraci	Protopteraspis	gosseletti	Lochkovian	21*		Dineley 1999
Agnatha	Heterostraci	Poraspis	polaris	Lochkovian	13*		Dineley 1999
Agnatha	Heterostraci	Poraspis	sericea	Lochkovian	20*		Dineley 1999
Agnatha	Heterostraci	Poraspis	rostrata	Lochkovian	18*		Elliott and Petriello 2011
Agnatha	Osteostraci	Cephalaspis	powrei	Lochkovian		12	Frickhinger 1991
Agnatha	Osteostraci	Cephalaspis	cradleyensis	Lochkovian	12*		Dineley 1999
Agnatha	Osteostraci	Cephalaspis	cwmmillensis	Lochkovian	11*		Dineley 1999
Agnatha	Osteostraci	Cephalaspis	abergavenniensis	Lochkovian	21*		Dineley 1999
Agnatha	Osteostraci	Cephalaspis	pagei	Lochkovian			Dineley 1999
Agnatha	Osteostraci	Cephalaspis	lyelli	Lochkovian			Moy-Thomas & Miles 1971
Agnatha	Osteostraci	Cephalaspis	toombsi	Lochkovian	30*		White 1935
Agnatha	Osteostraci	Cephalaspis	waynensis	Lochkovian	27*		White 1935

Agnatha	Osteostraci	Cephalaspis	virgoi	Lochkovian	28*		White 1935
Agnatha	Thelodonti	Turinia	pagei	Lochkovian		32	Frickhinger 1991
Agnatha	Heterostraci	Pteraspis	rostrata	Lochkovian		15	Frickhinger 1991
Agnatha	Heterostraci	Pteraspis	jackana	Lochkovian	15*		White 1935
Agnatha	Heterostraci	Pteraspis	mitchelli	Lochkovian	26*		Dineley 1999
Agnatha	Osteostraci	Cwmaspis	billcrofti	Lochkovian	14*		Dineley 1999
Agnatha	Heterostraci	Rhinopteraspis	crouchi	Lochkovian	17*		Dineley 1999
Agnatha	Heterostraci	Rhinopteraspis	dunensis	Lochkovian	17*		Dineley 1999
Agnatha	Thelodonti	Nikolivia	milesi	Lochkovian		15	Turner 1982
Agnatha	Heterostraci	Errivaspis	waynensis	Lochkovian		19	Mark-Kurik and Botella 2009
Agnatha	Heterostraci	Althaspis	leachi	Lochkovian	70*		Loeffler & Thomas 1980
Agnatha	Heterostraci	Althaspis	sennensis	Lochkovian	30*		Loeffler & Thomas 1980
Agnatha	Heterostraci	Althaspis	tarloi	Lochkovian	26*		Loeffler & Thomas 1980
Agnatha	Osteostraci	Zenaspis	kasymyri	Lochkovian	30*		Voichyshyn 2011
Agnatha	Heterostraci	Podolaspis	danieli	Lochkovian	17*		Voichyshyn 2011
Agnatha	Heterostraci	Djurinaspis	secunda	Lochkovian	30*		Voichyshyn 2011
Agnatha	Heterostraci	Semipodolaspis	slobodensis	Lochkovian	24*		Voichyshyn 2011
Agnatha	Osteostraci	Waengsjoeaspis	nahanniensis	Lochkovian	29*		Scott & Wilson 2012
Agnatha	Osteostraci	Waengsjoeaspis	platycornis	Lochkovian	22*		Scott & Wilson 2012
Agnatha	Heterostraci	Larovaspis	kneri	Lochkovian	14*		Lebedev et al. 2009
Agnatha	Galeaspida	Polybranchiaspis	liaojaoshanensis	Lochkovian-Pragian	16*		Moy-Thomas & Miles 1971
Agnatha	Galeaspida	Polybranchiaspis	minor	Lochkovian	4.3*		Moy-Thomas & Miles 1971
Agnatha	Galeaspida	Polybranchiaspis	yulongssus	Lochkovian	22*		Zhu & Gai 2007
Agnatha	Galeaspida	Laxaspis	qujingensis	Lochkovian	26*		Liu 1975
Agnatha	Galeaspida	Laxaspis	rostrata	Lochkovian	28*		Liu 1975
Agnatha	Galeaspida	Diandongaspis	xishancunensis	Lochkovian	20*		Liu 1975
Agnatha	Galeaspida	Damaspis	vartus	Lochkovian	10*		Wang & Wang 1982
Agnatha	Galeaspida	Stephaspis	dipteriga	Lochkovian	18*		Gai & Zhu 2007
Agnatha	Galeaspida	Eugaleaspis	changi	Lochkovian	9*		Liu 1975
Agnatha	Galeaspida	Nanpanaspis	microculus	Lochkovian	14*		Liu 1975
Agnatha	Galeaspida	Cyclodiscaspis	ctenus	Lochkovian	22*		Liu 1975
Agnatha	Osteostraci	Didymaspos	grinrodi	Lochkovian	8.6*		Obruchev 1967
Agnatha	Osteostraci	Timanaspis	kossovi	Lochkovian	21*		Obruchev 1967
Agnatha	Osteostraci	Sclerodus	pustuliferus	Lochkovian	5.8*		Obruchev 1967
Agnatha	Osteostraci	Asceraspis	robusta	Lochkovian	16*		Obruchev 1967
Agnatha	Osteostraci	Hemicyclaspis	murchisoni	Lochkovian		21	Obruchev 1967
Agnatha	Osteostraci	Hirella	gracilis	Lochkovian		9	Obruchev 1967
Agnatha	Anaspida	Rhyncholepis	parvulus	Lochkovian		7	Obruchev 1967
Agnatha	Anaspida	Pterygolepis	nitidus	Lochkovian		11	Obruchev 1967
Agnatha	Anaspida	Pharyngolepis	oblongus	Lochkovian		18	Obruchev 1967
Agnatha	Osteostraci	Parameteoraspis	oblongus	Lochkovian-Emsian	20*		Belles-Isles 1989
Agnatha	Heterostraci	Aporemaspis	pholidata	Lochkovian		11	Elliott & Loeffler 1984
Agnatha	Heterostraci	Stegobranchiaspis	baringensis	Lochkovian	29*		Elliott 1983
Agnatha	Heterostraci	Escharaspis	alata	Lochkovian	30*		Elliott 1983

Agnatha	Heterostraci	Unarkaspis	schultzei	Lochkovian	29*	Elliott 1983
Agnatha	Heterostraci	Ctenaspis	obruchevi	Lochkovian	14*	Dineley 1976
Agnatha	Heterostraci	Ctenaspis	russelli	Lochkovian	17*	Dineley 1976
Agnatha	Heterostraci	Sanqiaspis	vietnamensis	Lochkovian-Pragian	10*	Wang et al. 2010
Agnatha	Heterostraci	Laxaspis	yulongssus	Lochkovian-Pragian	19*	Wang et al. 2010
Agnatha	Heterostraci	Bannhuanaspis	vukhuci	Lochkovian-Pragian	30*	Wang et al. 2010
Agnatha	Osteostraci	Pattenaspis	rogalai	Lochkovian-Pragian	20*	Voichyshyn 2011
Agnatha	Osteostraci	Pattenaspis	whitei	Lochkovian	33*	Keating et al. 2012
Agnatha	Osteostraci	Diademaspis	janvieri	Lochkovian	40*	Keating et al. 2012
Agnatha	Osteostraci	Diademaspis?	mackenziensis	Lochkovian	9*	Adrian & Wilson 1994
Agnatha	Osteostraci	Stensiopelta	pusulata	Lochkovian-Pragian	23*	Janvier 1985
Agnatha	Osteostraci	Superciliaspis	gabrielsi		Lochkovian	5
Agnatha	Osteostraci	Tannuaspis	levenkoi	Lochkovian	24*	Afanassieva 1985
Agnatha	Osteostraci	Hoelaspis	angulata	Pragian	7*	Obruchev 1967
Agnatha	Osteostraci	Tauraspis	rara	Pragian	8*	Mark-Kurik & Janvier 1995
Agnatha	Osteostraci	Hapliaspis	apheles	Pragian	4*	Mark-Kurik & Janvier 1995
Agnatha	Osteostraci	Severaspis	rostralis	Pragian	6*	Mark-Kurik & Janvier 1995
Agnatha	Osteostraci	Benneviaspis	urvantsevi	Pragian	15*	Voichyshyn 2011
Agnatha	Osteostraci	Benneviaspis	podolica	Pragian	13*	Voichyshyn 2011
Agnatha	Osteostraci	Kiaeraspis	auchenaspidoides	Pragian	6*	Obruchev 1967
Agnatha	Osteostraci	Axinaspis	whitei	Pragian	16*	Moy-Thomas & Miles 1971
Agnatha	Osteostraci	Machairaspis	isachseni	Pragian	18*	Scott et al. 2013
Agnatha	Osteostraci	Victoraspis	longicornualis	Pragian	22*	Carlsson & Blom 2008
Agnatha	Osteostraci	Wladysagitta	janvieri	Pragian	17*	Voichyshyn 2006
Agnatha	Heterostraci	Poraspis	sp.	Pragian	6.2*	Elliott and Petriello 2011
Agnatha	Heterostraci	Dnestraspis	firma	Pragian	17*	Voichyshyn 2011
Agnatha	Heterostraci	Parapteraspis	plana	Pragian	17*	Voichyshyn 2011
Agnatha	Heterostraci	Alaeckaspis	ustechiensis	Pragian	22*	Voichyshyn 2011
Agnatha	Heterostraci	Althaspis	elongata	Pragian	22	Voichyshyn 2011
Agnatha	Heterostraci	Althaspis	sapovensis	Pragian	35*	Voichyshyn 2011
Agnatha	Heterostraci	Palanasaspis	chekhivensis	Pragian	9.3*	Voichyshyn 2011
Agnatha	Heterostraci	Europrotaspis	arnelli	Pragian	21*	Voichyshyn 2011
Agnatha	Heterostraci	Pavolaspis	pasternaki	Pragian	21*	Voichyshyn 2011
Agnatha	Heterostraci	Weigeltaspis	sp.	Pragian	23*	Voichyshyn 2011
Agnatha	Heterostraci	Benneviaspis	whitei	Pragian	11*	Voichyshyn 2011
Agnatha	Heterostraci	Benneviaspis	zychi	Pragian	22*	Voichyshyn 2011
Agnatha	Heterostraci	Citharaspis	polonica	Pragian	15*	Voichyshyn

						2011
Agnatha	Heterostraci	Citharaspis	junia	Pragian	15*	Voichyshyn 2011
Agnatha	Heterostraci	Zychaspis	granulata	Pragian	18*	Voichyshyn 2011
Agnatha	Heterostraci	Doryaspis	nathorsi	Pragian	21*	Pernegre 2004
Agnatha	Heterostraci	Doryaspis	arctica	Pragian	17*	Pernegre 2004
Agnatha	Heterostraci	Zascinaspis	laticephala	Pragian	38*	Blieck & Goujet 1983
Agnatha	Heterostraci	Spitbergaspis	prima	Pragian	14*	Pernegre 2004
Agnatha	Heterostraci	Gigantaspis	laticephala	Pragian	28*	Pernegre 2004
Agnatha	Heterostraci	Gigantaspis	isachuen	Pragian	55*	Pernegre 2004
Agnatha	Heterostraci	Gigantaspis	bocki	Pragian	19*	Pernegre 2004
Agnatha	Heterostraci	Drepanaspis	gemuendenensis	Pragian-Emsian	60	Obruchev 1967
Agnatha	Osteostraci	Acrotomaspis	instabilis	Pragian	5.4*	Obruchev 1967
Agnatha	Galeaspida	Lungmenshanaspis	yunnanaspis	Pragian	9*	Wang et al. 1996
Agnatha	Galeaspida	Sanqiaspis	zhaotongensis	Pragian	11*	Zhao & Zhu 2010
Agnatha	Galeaspida	Sanqiaspis	rostrata	Pragian	11*	Zhao & Zhu 2010
Agnatha	Galeaspida	Qingmenaspis	microculus	Pragian	5*	Liu 1993
Agnatha	Galeaspida	Gantarostrataspis	gengi	Pragian	20*	Wang 1992
Agnatha	Galeaspida	Gumuaspis	rostrata	Pragian	15*	Wang 1992
Agnatha	Galeaspida	Macrothyraspis	longicornis	Pragian	10*	Zhao et al. 2002
Agnatha	Galeaspida	Hunanaspis	wudinensis	Pragian	23*	Liu 1975
Agnatha	Galeaspida	Wenshanaspis	zhichangensis	Pragian	9*	Zhao et al. 2002
Agnatha	Galeaspida	Zhaotongaspis	janvieri	Pragian	20*	Wang & Zhu 1994
Agnatha	Galeaspida	Pterogonaspis	yuhaii	Pragian	21*	Zhu 1992
Agnatha	Galeaspida	Dongfangaspis	major	Pragian	80*	Liu 1975
Agnatha	Galeaspida	Lungmenshanaspis	kiangyouensis	Pragian	41*	Wang et al. 1996
Agnatha	Galeaspida	Eugaleaspis	xujiachongensis	Pragian	14*	Zhao & Zhu 2010
Agnatha	Heterostraci	Zascinaspis	carmani	Pragian	33*	Blieck & Goujet 1983
Agnatha	Heterostraci	Allocryptaspis	laticostatus	Pragian	25*	Denison 1960
Agnatha	Heterostraci	Cosmaspis	transversa	Pragian	38*	Denison 1970
Agnatha	Heterostraci	Lampraspis	tuberculata	Pragian	32*	Denison 1970
Agnatha	Heterostraci	Protaspis	brevispina	Pragian	48*	Denison 1970
Agnatha	Heterostraci	Protaspis	mcgrewi	Pragian	37*	Denison 1970
Agnatha	Heterostraci	Cardipeltis	richardsoni	Pragian	36*	Denison 1966
Agnatha	Heterostraci	Cardipeltis	bryanti	Pragian	37*	Denison 1966
Agnatha	Heterostraci	Amphiaspis	argos	Pragian	49*	Obruchev 1967
Agnatha	Heterostraci	Hibernaspis	macrolepis	Pragian-Emsian	41*	Obruchev 1967
Agnatha	Heterostraci	Eglonaspis	rostrata	Pragian-Emsian	38*	Obruchev 1967
Agnatha	Heterostraci	Olbiaspis	coalescens	Pragian-Emsian	29*	Obruchev 1967
Agnatha	Heterostraci	Siberiaspis	plana	Pragian-Emsian	26*	Obruchev 1967
Agnatha	Heterostraci	Angaraspis	urvantzevi	Pragian-Emsian	23*	Obruchev 1967
Agnatha	Osteostraci	Gustavaspis	trinodis	Emsian-Eifelian	7*	Obruchev 1967
Agnatha	Heterostraci	Poraspis	thomasi	Emsian	6.2*	Elliott and Petriello 2011
Agnatha	Galeaspida	Duyunaspis	paoyangensis	Emsian	20*	Zhao & Zhu

						2010
Agnatha	Heterostraci	Panamintaspis	snowi	Emsian	52*	Elliott & Ilyes 1996
Agnatha	Heterostraci	Blieckaspis	priscillae	Emsian	46*	Elliott & Ilyes 1996
Agnatha	Heterostraci	Indet. Pteraspidid	A	Emsian	9.7*	Elliott & Ilyes 1996
Agnatha	Heterostraci	Indet. Pteraspidid	B	Emsian	15*	Elliott & Ilyes 1996
Agnatha	Osteostraci	Yvonaspis	campbelltonensis	Emsian-Eifelian	44*	Belles-Isles 1988
Agnatha	Osteostraci	Yvonaspis	westolli	Emsian-Eifelian	35*	Belles-Isles 1988
Agnatha	Osteostraci	Parameteoraspis	moythomasi	Emsian-Eifelian	27*	Belles-Isles 1988
Agnatha	Heterostraci	Pleurgaspis	macrorhyncha	Emsian	23*	Obruchev 1967
Agnatha	Osteostraci	Nectaspis	areolata	Emsian	12*	Obruchev 1967
Agnatha	Heterostraci	Lechriaspis	patula	Emsian	12*	Elliott and Petriello 2011
Agnatha	Heterostraci	Cardipeltis	wallaci	Emsian	43*	Denison 1966
Agnatha	Heterostraci	Protaspis	dorfi	Emsian	41*	Bryant 1933
Agnatha	Heterostraci	Protaspis	bucheri	Emsian	24*	Denison 1953
Agnatha	Osteostraci	Cephalaspis	wyomingensis	Emsian	30*	Bryant 1933
Agnatha	Osteostraci	Cephalaspis	utahensis	Emsian	15*	Elliott et al. 1999
Agnatha	Osteostraci	Cephalaspis	brevirostris	Emsian	20*	Denison 1952
Agnatha	Heterostraci	Allocryptaspis	utahensis	Emsian	30*	Denison 1953a
Agnatha	Heterostraci	Allocryptaspis	ellipticus	Emsian	25*	Denison 1953a
Agnatha	Heterostraci	Clydonaspis	fabrensis	Emsian	25*	Elliott 1994
Agnatha	Heterostraci	Oreaspis	dunklei	Emsian	19*	Denison 1970
Agnatha	Heterostraci	Oreaspis	williamsi	Emsian	33*	Denison 1970
Agnatha	Heterostraci	Tuberculaspis	elyensis	Emsian	11*	Ilyes and Elliott 1994
Agnatha	Heterostraci	Pirumaspis	lancasteri	Emsian	28*	Ilyes and Elliott 1994
Agnatha	Heterostraci	Lamiaspis	longiripa	Emsian	24*	Ilyes and Elliott 1994
Agnatha	Osteostraci	Ilemoraspis	kirkinskayae	Emsian-Givetian	20*	Sansom et al. 2008
Agnatha	Heterostraci	Tartuosteus	sp.	Eifelian-Givetian	200	Elliott et al. 2004
Agnatha	Heterostraci	Pycnosteus	sp.	Eifelian-Givetian	200	Elliott et al. 2004
Agnatha	Osteostraci	Balticaspis	latvica	Eifelian	5*	Otto & Laurin 2001
Agnatha	Heterostraci	Psammosteus	praecursor	Eifelian-Frasnian	84*	Elliott & Mark-Kurik 2005
Agnatha	Heterostraci	Psammosteus	livonicus	Eifelian-Givetian	74*	Elliott & Mark-Kurik 2005
Agnatha	Heterostraci	Psammolepis	venyukovi	Eifelian-Givetian	79*	Lebedev et al. 2009
Agnatha	Heterostraci	Psammolepis	proia	Eifelian-Givetian	101*	Elliott & Mark-Kurik 2005
Agnatha	Heterostraci	Psammolepis	undulata	Eifelian-Givetian	56*	Elliott & Mark-Kurik 2005
Agnatha	Galeaspida	Clarorbis	apponomedianus	Eifelian	20*	Pan & Ji 1993
Agnatha	Heterostraci	Rhinopteraspis	cornubica	Eifelian	14*	Tarlo 1961
Agnatha	Osteostraci	Trewinia	magnifica	Eifelian-Frasnian	60	Moy-Thomas & Miles 1971
Agnatha	Hyperoartii	Cornovichthys	blaauweni	Eifelian	12	Newman & Trewin 2001
Agnatha	Heterostraci	Psammosteus	bergi	Givetian	98*	Elliott & Mark-Kurik 2005
Agnatha	Heterostraci	Schizosteus	shkurlatensis	Givetian	39*	Moloshnikov 2009

Agnatha	Heterostraci	Tartuosteus	zhelezniogerskensis	Frasnian	56*	Moloshnikov 2007
Agnatha	Osteostraci	Alaspis	rosamundae	Frasnian	180	Janvier & Arsenault 1996
Agnatha	Osteostraci	Escuminaspis	laticeps	Frasnian	38	Janvier et al. 2004
Agnatha	Heterostraci	Aspidosteus	heckeri	Frasnian	100*	Obruchev 1967
Agnatha	Heterostraci	Obruchevia	heckleri	Frasnian	140*	Elliott et al. 2004
Agnatha	Heterostraci	Perscheia	pulla	Frasnian	49*	Elliott et al. 2004
Agnatha	Anaspida	Legendrelepis	parenti	Frasnian	8.5	Janvier 1996
Agnatha	Anaspida	Eupanerops	longaevus	Frasnian	10	Janvier 1996
Agnatha	Anaspida	Endeiolepis	aneri	Frasnian	16	Janvier 1996
Agnatha	Osteostraci	Levesquaspis	patteni	Frasnian	10*	Robertson 1936
Chondrichthyes	Elasmobranchii	Antarctilamna	sp.	Pragian-Emsian	40	Long 2011
Chondrichthyes	NA	Stensioella	heintzi	Pragian-Emsian	22	Bartels et al. 1998
Chondrichthyes	Elasmobranchii	Doliodus	problematicus	Emsian	23	Miller et al. 2003
Chondrichthyes	NA	Zamponiopteron	spinifera	Emsian-Eifelian	43*	Maisley & Janvier 2011
Chondrichthyes	NA	Pucapampella	rodrigae	Emsian-Eifelian	25*	Janvier & Suarez-Riglos 1986
Chondrichthyes	NA	Pucapampella	sp.	Emsian-Eifelian	30*	Maisley & Janvier 2011
Chondrichthyes	NA	Acmoniodus	clarkei	Frasnian	200*	Hussakof and Bryant 1918
Chondrichthyes	NA	Cladoselache	acanthopterygius	Frasnian	68*	Hussakof and Bryant 1918
Chondrichthyes	NA	Cladoselache	brachypterygius	Frasnian	69	Hussakof and Bryant 1918
Chondrichthyes	NA	Cladoselache	desmopterygius	Frasnian	29	Hussakof and Bryant 1918
Chondrichthyes	NA	Cladoselache	fyleri	Frasnian	39	Hussakof and Bryant 1918
Chondrichthyes	NA	Cladoselache	kepleri	Frasnian	160	Hussakof and Bryant 1918
Chondrichthyes	NA	Cladoides	wildungensis	Frasnian	500*	Maisley 2005
Chondrichthyes	Elasmobranchii	Ctenacanthus	major	Frasnian-Visean	270*	Maisley 1981
Chondrichthyes	Elasmobranchii	Ctenacanthus	chemungensis	Frasnian	76*	Lelievre & Derycke 1998
Chondrichthyes	Elasmobranchii	Ctenacanthus	randalli	Frasnian	230*	Eastman 1907
Chondrichthyes	NA	Gladbachus	adentadus	Frasnian	11	Ginter 2004
Chondrichthyes	NA	Rhynchodus	pertenius	Frasnian	110*	Eastman 1907
Chondrichthyes	Elasmobranchii	Protacrodus	vetustus	Frasnian-Tournaisian	36*	Zangerl 1981
Chondrichthyes	NA	Diademodus	hydei	Famennian	40	Harris 1951
Chondrichthyes	NA	Tamobatis	vestustus	Famennian	120*	Williams 1998
Chondrichthyes	Elasmobranchii	Ctenacanthus	compressus	Famennian-Tournaisian	140*	Maisley 1981
Chondrichthyes	Elasmobranchii	Ctenacanthus	angustus	Famennian-Tournaisian	190*	Lelievre & Derycke 1998
Chondrichthyes	Elasmobranchii	Ctenacanthus	nodocostatus	Famennian	130*	Newberry 1889
Chondrichthyes	NA	Ageleodus	pectinatus	Famennian	50*	Long 2011
Chondrichthyes	NA	Plesiosclachus	macracanthus	Famennian	16	Coates & Gess 2007
Chondrichthyes	NA	Tuberospina	nataliae	Famennian	82*	Lebedev 1995
Chondrichthyes	NA	Thoralodus	cabrieri	Famennian	140*	Vorobyeva and Obruchev 1967
Chondrichthyes	NA	Stethacanthus	sp.	Famennian	70	Zhao & Zhu 2010

Chondrichthyes	Elasmobranchii	"Ctenacanthus"	vetustus	Famennian	180*	Maisley 1981
Chondrichthyes	Elasmobranchii	Tristychius	arcuatus	Tournaisian-Serpukhovian	50	Zangerl 1981
Chondrichthyes	Elasmobranchii	Ctenacanthus	altoensis	Tournaisian	150	Lund and Grogan, 2005
Chondrichthyes	Elasmobranchii	Ctenacanthus	formosus	Tournaisian	270*	Newberry 1873
Chondrichthyes	Elasmobranchii	Ctenacanthus	littoni	Tournaisian	290*	Newberry 1889
Chondrichthyes	Elasmobranchii	Ctenacanthus	varians	Tournaisian	76*	St. John & Worthen 1875
Chondrichthyes	Elasmobranchii	Ctenacanthus	keokuk	Tournaisian	190*	Eastman 1902
Chondrichthyes	Elasmobranchii	Symmorium	sp.	Tournaisian-Visean	200*	Zangerl 1981
Chondrichthyes	Elasmobranchii	Acondylacanthus	gracilis	Tournaisian	200*	St. John & Worthen 1875
Chondrichthyes	Elasmobranchii	Anaclitacanthus	semicostatus	Tournaisian	120*	St. John & Worthen 1875
Chondrichthyes	Elasmobranchii	Phoebodus	sp.	Tournaisian	70*	Zangerl 1981
Chondrichthyes	Elasmobranchii	Sphenacanthus	marshi	Tournaisian	140*	Newberry 1873
Chondrichthyes	Holocephali	Mazodus	kepleri	Tournaisian	340*	Newberry 1889
Chondrichthyes	Symmorida	Denaea	sp.	Tournaisian-Serpukhovian	50	Zangerl 1981
Chondrichthyes	Holocephali	Helodus	coniculus	Tournaisian	45	Vorobyeva & Obruchev 1967
Chondrichthyes	Elasmobranchii	Eunemacanthus	krapivnensis	Tournaisian	52*	Lebedev 1996
Chondrichthyes	Elasmobranchii	Xenacanthus	sp.	Tournaisian	200*	Moy-Thomas 1971
Chondrichthyes	Holocephali	Physonemus	gemmatus	Tournaisian	200*	Eastman 1917
Chondrichthyes	Elasmobranchii	Bythiacanthus	ianishevskyi	Tournaisian-Visean	80*	Eastman 1902
Chondrichthyes	Elasmobranchii	Bythiacanthus	lucasi	Tournaisian	68*	Eastman 1902
Chondrichthyes	Elasmobranchii	Bythiacanthus	solidus	Tournaisian	72*	Eastman 1902
Chondrichthyes	Symmorida	Falcatus	falcatus	Tournaisian-Serpukhovian	30	Lund and Grogan 2005
Chondrichthyes	Elasmobranchii	Asteroptychius	elegans	Tournaisian	110*	Newberry 1889
Chondrichthyes	Elasmobranchii	Wodnika?	triangularis	Tournaisian	80	Zangerl 1981
Chondrichthyes	Holocephali	Glymmatacanthus	irishii	Tournaisian	170*	St. John & Worthen 1875
Chondrichthyes	Holocephali	Batacanthus	baculiformis	Tournasian	190*	St. John & Worthen 1875
Chondrichthyes	Elasmobranchii	Goodrichthys	eksdalensis	Visean	90	Zangerl 1981
Chondrichthyes	Elasmobranchii	Onychoselache	traquairi	Visean-Serpukhovian	15	Zangerl 1981
Chondrichthyes	Elasmobranchii	Sphenacanthus	serrulatus	Visean	230*	Zangerl 1981
Chondrichthyes	Holocephali	Deltoptychius	armigerus	Visean-Serpukhovian	45*	Moy-Thomas 1971
Chondrichthyes	Holocephali	Chondrenchelys	problematica	Visean	12	Frickhinger 1991
Chondrichthyes	Elasmobranchii	Ctenacanthus	costellatus	Visean	90	Zangerl 1981
Chondrichthyes	Elasmobranchii	Ctenacanthus	denticulatus	Visean	76*	Newberry 1873
Chondrichthyes	Holocephali	Eucentrurus	paradoxus	Visean	6	Stahl 1999
Chondrichthyes	Elasmobranchii	Cladodus	elegans	Visean	120*	Ginter & Maisley 2007
Chondrichthyes	Symmorida	Stethacanthus	altonensis	Visean-Serpukhovian	150	Lund & Grogan 2005
Chondrichthyes	Elasmobranchii	Asteroptychius	semiornatus	Visean	52*	McCoy 1854
Chondrichthyes	Elasmobranchii	Coelosteus	ferox	Visean	270*	Newberry 1889
Chondrichthyes	Elasmobranchii	Cratoselache	pruvosti	Visean	73*	Zangerl 1981
Chondrichthyes	Holocephali	Deltodus	croftoni	Visean	94*	Woodward 1900
Chondrichthyes	Holocephali	Helodus	turgidus	Visean	45	Stahl 1999
Chondrichthyes	Holocephali	Physonemus	arcuatus	Visean	300*	Newberry 1889
Chondrichthyes	Holocephali	Physonemus	altonensis	Visean	140*	St. John & Worthen 1875

Chondrichthyes	Elasmobranchii	Psammodus	sp.	Visean	70*		Gijon & Rodriguez 1991
Chondrichthyes	Holocephali	Erismacanthus	jonesi	Visean	83*		Stahl 1999
Chondrichthyes	Holocephali	Erismacanthus	maccoyanus	Visean		25*	Stahl 1999
Chondrichthyes	Holocephali	Erismacanthus	formosus	Visean	180*		Stahl 1999
Chondrichthyes	Elasmobranchii	Amelacanthus	sulcatus	Visean	80*		Maisley 1982
Chondrichthyes	Elasmobranchii	Amelacanthus	plicatus	Visean	64*		Maisley 1982
Chondrichthyes	Elasmobranchii	Amelacanthus	laevis	Visean	87*		Maisley 1982
Chondrichthyes	Elasmobranchii	Amelacanthus	pustulatus	Visean	57*		Maisley 1982
Chondrichthyes	Elasmobranchii	Eunemacanthus	costatus	Visean	100*		Maisley 1982
Chondrichthyes	Elasmobranchii	Eunemacanthus	heterogyrinus	Visean	87*		Maisley 1982
Chondrichthyes	Elasmobranchii	Bythiacanthus	brevis	Visean	120*		Maisley 1982
Chondrichthyes	Elasmobranchii	Bythiacanthus	vanhornei	Visean	80*		Maisley 1982
Chondrichthyes	Elasmobranchii	Amacanthus	gibbosus	Visean	40*		St. John & Worthen 1875
Chondrichthyes	Elasmobranchii	Geisacanthus	stellatus	Visean	40*		St. John & Worthen 1875
Chondrichthyes	Holocephali	Stichacanthus	coemansi	Visean	25		Stahl 1999
Chondrichthyes	Symmorida	Akmoniston	zangerli	Serpukhovian	65		Coates & Sequiera 2001
Chondrichthyes	Holocephali	Deltoptychius	sp.	Serpukhovian	50		Frickhinger 1991
Chondrichthyes	Euchrondrocephalii	Gregorius	rexi	Serpukhovian	12		Lund & Grogan 2005
Chondrichthyes	Euchrondrocephalii	Srianta	dawsoni	Serpukhovian	23*		Lund & Grogan 2005
Chondrichthyes	Euchrondrocephalii	Debeerius	ellefseni	Serpukhovian		30	Lund & Grogan 2005
Chondrichthyes	Elasmobranchii	Heteropetalus	elegantulus	Serpukhovian		7	Zangerl 1981
Chondrichthyes	Elasmobranchii	Belantsea	montana	Serpukhovian		67	Lund & Grogan 2005
Chondrichthyes	Elasmobranchii	Janassa	bituminosa	Serpukhovian		26	Frickhinger 1991
Chondrichthyes	Elasmobranchii	Netsepoye	hawesi	Serpukhovian	5.5		Lund 1989
Chondrichthyes	Elasmobranchii	Petalorhyncus	beargulchensis	Serpukhovian		10*	Lund 1989
Chondrichthyes	Elasmobranchii	Siksika	ottae	Serpukhovian		13*	Lund 1989
Chondrichthyes	Holocephali	Harpacanthus	fimbriatus	Serpukhovian		20	Lund & Grogan 2005
Chondrichthyes	Chondrechelyiformes	Harpagofugator	volsellorhinus	Serpukhovian		17	Lund 1982
Chondrichthyes	Holocephali	Traquairius	agkistrocephalus	Serpukhovian		46	Lund & Grogan 2005
Chondrichthyes	Holocephali	Traquairius	spinosus	Serpukhovian	30		Lund & Grogan 2005
Chondrichthyes	Symmorida	Damocles	serratus	Serpukhovian	60		Lund & Grogan 2005
Chondrichthyes	Symmorida	Stethacanthus	productus	Serpukhovian		270	Lund & Grogan 2005
Chondrichthyes	Symmorida	Orestiacanthus	fergusi	Serpukhovian		20*	Lund 1984
Chondrichthyes	Symmorida	Squatinactis	caudispinatus	Serpukhovian		15	Zangerl 1981
Chondrichthyes	Symmorida	Squatinactis	montanus	Serpukhovian		60	Lund & Grogan 2005
Chondrichthyes	Elasmobranchii	Thrinacoselache	gracia	Serpukhovian		90	Grogan & Lund 2008
Chondrichthyes	Elasmobranchii	Gutturensis	nielsoni	Serpukhovian		135	Sequeira and Coates 2000
Chondrichthyes	Elasmobranchii	Pleuracanthus	horridus	Serpukhovian	28*		Traquair 1882
Chondrichthyes	Elasmobranchii	Pleuracanthus	gracilis	Serpukhovian		44*	Traquair 1882

Chondrichthyes	Holocephali	Rainerichthys	zangerli	Serpukhovian	12.89	Grogan & Lund 2009
Chondrichthyes	Holocephali	Papillioninchthys	stahlae	Serpukhovian	10.31	Grogan & Lund 2009
Chondrichthyes	Holocephali	Helodus	simplex	Serpukhovian	45	Stahl 1999
Chondrichthyes	Holocephali	Deltodus	angularis	Serpukhovian	66*	Stahl et al. 2000
Chondrichthyes	Elasmobranchii	Sphenacanthus	hybodoides	Serpukhovian	190*	Maisley 1982
Chondrichthyes	Holocephali	Erismacanthus	sp.	Serpukhovian	12	Stahl 1999
Chondrichthyes	NA	unknown	sp. 1	Serpukhovian	12	Frickhinger 1991
Chondrichthyes	Holocephali	unknown	sp. 2	Serpukhovian	10	Lund & Grogan 2005
Chondrichthyes	Holocephali	unknown	sp. 3	Serpukhovian	10	Lund & Grogan 2005
Chondrichthyes	NA	COCH 1	sp.	Serpukhovian	15	Stahl 1999
Chondrichthyes	Holocephali	Lestrodus	newtoni	Serpukhovian	300*	Zangerl 1981
Placodermi	Arthrodira	Kujdanwiaspis	podolica	Lochkovian-Pragian	15	Dupret et al. 2011
Placodermi	Arthrodira	Wheathillaspis	wickhamkingi	Lochkovian	20*	Denison 1978
Placodermi	Arthrodira	Heightingtonaspis	anglica	Lochkovian	30*	Denison 1978
Placodermi	Arthrodira	Heightingtonaspis	willsi	Lochkovian	50*	Denison 1978
Placodermi	Arthrodira	Heightingtonaspis	clarkei	Lochkovian	20*	Denison 1978
Placodermi	Arthrodira	Erikaspis	zychi	Lochkovian	50*	Dupret et al. 2011
Placodermi	Arthrodira	Palaeacanthaspis	vasta	Lochkovian	20*	Dupret et al. 2011
Placodermi	Acanthothoraci	Hagiangella	goujeti	Lochkovian	7*	Wang et al. 2010
Placodermi	Antiarcha	Minicrania	lissa	Lochkovian	8*	Wang et al. 2010
Placodermi	Antiarcha	Chuchinolepis	dongmoensis	Lochkovian	6*	Wang et al. 2010
Placodermi	Antiarcha	Yunnanolepis	bacboensis	Lochkovian	14*	Wang et al. 2010
Placodermi	Antiarcha	Yunnanolepis	chii	Lochkovian	18*	Zhao & Zhu 2010
Placodermi	Antiarcha	Yunnanolepis	porifera	Lochkovian	7*	Zhu 1996
Placodermi	Antiarcha	Heteroyunnanolepis	qujingensis	Lochkovian	22*	Zhu 1996
Placodermi	Antiarcha	Chuchinolepis	gracilis	Lochkovian	6*	Zhu 1996
Placodermi	Antiarcha	Zhanjilepis	aspriatilis	Lochkovian	6*	Zhu 1996
Placodermi	Antiarcha	Minicrania	lirouyii	Lochkovian	4.5*	Zhu & Janvier 1996
Placodermi	Petalichthyida	Diandongpetalichthys	liaojaoshanensis	Lochkovian	10*	Zhu 1991
Placodermi	Arthrodira	Szelepis	yunnanensis	Lochkovian-Pragian	30*	Liu 1979
Placodermi	Antiarcha	Phymolepis	cuifengshanensis	Lochkovian	8*	Zhu 1996
Placodermi	Antiarcha	Phymolepis	guoruii	Lochkovian	22*	Zhu 1996
Placodermi	Antiarcha	Chuchinolepis	qujingensis	Lochkovian	10*	Zhu 1996
Placodermi	Antiarcha	Chuchinolepis	sulcata	Lochkovian	17*	Zhu 1996
Placodermi	Antiarcha	Chuchinolepis	robusta	Lochkovian	7*	Zhu 1996
Placodermi	Antiarcha	Gavinaspis	convergens	Lochkovian	38*	Zhao & Zhu 2010
Placodermi	Antiarcha	Eskimaspis	heintzi	Lochkovian	23*	Dineley & Liu 1984
Placodermi	Antiarcha	Baringaspis	dineleyi	Lochkovian	49*	Miles 1973
Placodermi	Antiarcha	Yunnanolepis	meemannae	Pragian	29*	Thanh & Janvier 1994
Placodermi	Arthrodira	Yujiangolepis	suni	Pragian	25*	Zhu et al. 2010
Placodermi	Petalichthyida	Neopetalichthys	yenmenpaensis	Pragian	18*	Liu 1973

Placodermi	Arthrodira	Yiminaspis	shenme	Pragian	12*	Dupret 2008
Placodermi	Antiarcha	Mizia	longhuanensis	Pragian	6.5*	Zhu 1996
Placodermi	Arthrodira	Kujdanwiaspis	buczacziensis	Pragian	30*	Dupret 2010
Placodermi	Arthrodira	Radontina	prima	Pragian	40*	Denison 1978
Placodermi	Arthrodira	Radontina	tessellata	Pragian	28*	Denison 1978
Placodermi	Arthrodira	Arabosteus	variabilis	Pragian	23*	Olive et al. 2011
Placodermi	Arthrodira	Eukaia	elongata	Pragian	44*	Mark-Kurik 2013
Placodermi	Arthrodira	Tityosteus	rieversi	Pragian	200	Bartels et al. 1998
Placodermi	Arthrodira	Lunaspis	heroldi	Pragian	15	Bartels et al. 1998
Placodermi	Arthrodira	Lunaspis	broilii	Pragian	45	Bartels et al. 1998
Placodermi	Arthrodira	Gemuendina	stuertzi	Pragian	100	Bartels et al. 1998
Placodermi	Arthrodira	Proaethaspis	ohioensis	Pragian	12*	Denison 1960
Placodermi	Arthrodira	Kueichowlepis	sinensis	Emsian	48*	Liu 1979
Placodermi	Antiarcha	Dayaoshania	youngi	Emsian	18*	Ritchie et al. 1992
Placodermi	Arthrodira	Jiuchengia	longoccipita	Emsian-Givetian	110*	Wang & Wang 1983
Placodermi	Arthrodira	Exutaspis	megista	Emsian-Givetian	67*	Lin & Wang 1981
Placodermi	Arthrodira	Xiangshuiosteus	wui	Emsian	31*	Wang 1992
Placodermi	Antiarcha	Liguanolepis	pileos	Emsian	6.7*	Zhang & Young 1992
Placodermi	Antiarcha	Wudinolepis	weni	Emsian	4.9*	Zhang 1965
Placodermi	Antiarcha	Microbranchius	chuandongensis	Emsian	26*	Zhao & Zhu 2010
Placodermi	Antiarcha	Xichonolepis	qujingensis	Emsian-Eifelian	70*	Ritchie et al. 1992
Placodermi	Antiarcha	Bothriolepis	tungseni	Emsian-Eifelian	29*	Zhang 1965
Placodermi	Arthrodira	Groenlandaspis	sp.	Emsian-Eifelian	25	Dineley 1999
Placodermi	Arthrodira	Taemosteus	novaustrocambricus	Emsian	140*	Young 2004
Placodermi	Antiarcha	Bothriolepis	sp.	Emsian	50*	Frickhinger 1991
Placodermi	Petalichthyida	Notopetalichthys	hillsi	Emsian	33*	Denison 1978
Placodermi	Arthrodira	Goodradigbeeon	australiensis	Emsian	150*	White 1978
Placodermi	Arthrodira	Coccosteus	sp.	Emsian	40	Frickhinger 1991
Placodermi	Arthrodira	Edgellaspis	gorteri	Emsian-Eifelian	34*	Hunt and Young 2011
Placodermi	Arthrodira	Dhanguura	johnstoni	Emsian	230*	Young 2004
Placodermi	Arthrodira	Cathlesichthys	weejasperensis	Emsian	270*	Young 2004
Placodermi	Arthrodira	Weejasperensis	gavini	Emsian	20*	White 1978
Placodermi	Arthrodira	Burrinjucosteus	asymmetricus	Emsian	94*	White 1978
Placodermi	Arthrodira	Buchanosteus	confertituberculatus	Emsian	74*	Young 1979
Placodermi	Arthrodira	Arenipiscis	westolli	Emsian	87*	Young 1981
Placodermi	Arthrodira	Errolosteus	goodragibeensis	Emsian	77*	Young 1981
Placodermi	Arthrodira	Elvaspis	tuberculata	Emsian	15*	Young 2009
Placodermi	Arthrodira	Elvaspis	whitei	Emsian	11*	Young 2009
Placodermi	Arthrodira	Bimbianga	burrinjuckensis	Emsian	130*	Young 2005
Placodermi	Petalichthyida	Wijdeaspis	warrooensis	Emsian	20*	Denison 1978; Young 1978
Placodermi	Arthrodira	Nefundia	qalibahensis	Emsian	51*	Lelievre et al. 1985
Placodermi	Arthrodira	Aleosteus	eganensis	Emsian	18*	Johnson et al. 2000

Placodermi	Arthrodira	Anarthraspis	montana	Emsian	69*		Bryant & Ruedemann 1934
Placodermi	Arthrodira	Bryantolepis	brachycephala	Emsian	14*		Elliott & Carr 2010
Placodermi	Arthrodira	Bryantolepis	williamsi	Emsian	22*		Elliott & Carr 2010
Placodermi	Arthrodira	Simblaspis	cachensis	Emsian	47*		Denison 1953b
Placodermi	Arthrodira	Aethaspis	major	Emsian	59*		Denison 1953b
Placodermi	Arthrodira	Aethaspis	utahensis	Emsian	31*		Denison 1953b
Placodermi	Arthrodira	Atlantidosteus	pacifica	Eifelian	500*		Young 2003
Placodermi	Arthrodira	Coccosteus	cuspidatus	Eifelian-Givetian	40		Denison 1978
Placodermi	Antiarcha	Sherbonaspis	andreannae	Eifelian-Givetian	20*		Pateleyev 1993
Placodermi	Rhenanida	Bolivosteus	chacomensis	Eifelian	8*		Maisley & Janvier 2011
Placodermi	Arthrodira	Holonema	sp.	Eifelian	19*		Rade 1964
Placodermi	Antiarcha	Byssacanthus	dilatatus	Eifelian-Frasnian	30		Denison 1978
Placodermi	Antiarcha	Asterolepis	estonica	Eifelian		50*	Denison 1978
Placodermi	Arthrodira	Homosteus	sp.	Eifelian	120*		Dineley 1999
Placodermi	Arthrodira	Homosteus	milleri	Eifelian	170*		Denison 1978
Placodermi	Arthrodira	Homosteus	sulcatus	Eifelian	21*		Mark-Kurik 1993
Placodermi	Arthrodira	Actinolepis	magna	Eifelian-Givetian		99*	Denison 1978
Placodermi	Arthrodira	Actinolepis	tuberculata	Eifelian-Givetian	56*		Denison 1978
Placodermi	Arthrodira	Actinolepis	sp.	Eifelian	34*		Newman & Trewin 2008
Placodermi	Arthrodira	Hybosteus	mirabilis	Eifelian-Givetian	97*		Denison 1978
Placodermi	Arthrodira	Luetkeichthys	borealis	Eifelian	100*		Denison 1978
Placodermi	Petalichthyida	Wijdeaspis	arctica	Eifelian	33*		Denison 1978; Young 1978
Placodermi	Arthrodira	Heterosteus	asmussi	Eifelian	600		Denison 1978
Placodermi	Arthrodira	Dickosteus	threiplandi	Eifelian-Givetian	50		Denison 1978
Placodermi	Arthrodira	Carolowilhemina	geognostica	Eifelian	300*		Mark-Kurik & Carls 2002
Placodermi	Antiarcha	Pterichthyodes	milleri	Eifelian-Givetian	25*		Denison 1978
Placodermi	Ptyctodontida	Rhamphodopsis	threiplandi	Eifelian-Frasnian	8.8		Dineley 1999
Placodermi	Ptyctodontida	Goniosteus	gerolsteinensis	Eifelian-Givetian		35*	Denison 1978
Placodermi	Antiarcha	Wurungulepis	denisoni	Eifelian		36*	Young 1990
Placodermi	Ptyctodontida	Palaeospondylus	gunni	Eifelian-Givetian	29*		Sollas & Sollas 1904
Placodermi	Antiarcha	Bothriolepis	sinensis	Eifelian-Givetian	20*		Zhang 1965
Placodermi	Antiarcha	Bothriolepis	niushoushanensis	Eifelian		33*	Zhao & Zhu 2010
Placodermi	Antiarcha	Hunanolepis	xiui	Eifelian	50*		Zhao & Zhu 2010
Placodermi	Antiarcha	Yangaspis	jinningensis	Eifelian-Givetian	160*		Lin & Wang 1981
Placodermi	Petalichthyida	Quasipetalichthys	haikouensis	Eifelian-Givetian	58*		Denison 1978
Placodermi	Petalichthyida	Guangxipetalichthys	tiaomajianensis	Eifelian	18*		Ji & Pan 1997
Placodermi	Petalichthyida	Guangxipetalichthys	bobaiensis	Eifelian	28*		Ji & Pan 1997
Placodermi	Antiarcha	Dianolepis	liui	Eifelian-Givetian	50*		Zhang 1965
Placodermi	Antiarcha	Thursius	wudingensis	Eifelian	29*		Fan 1992

Placodermi	Antiarcha	Microbranchius	sinensis	Eifelian	5*	Pan 1984
Placodermi	Ptyctodontida	Desmoporella	minor	Givetian	15*	Denison 1978
Placodermi	Ptyctodontida	Palaeomylus	greenei	Givetian	230*	Denison 1978
Placodermi	Ptyctodontida	Palaeomylus	fragens	Givetian	270*	Denison 1978
Placodermi	Ptyctodontida	Ptyctodus	calceolus	Givetian	80*	Denison 1978
Placodermi	Ptyctodontida	Ptyctodus	ferox	Givetian	250*	Denison 1978
Placodermi	Ptyctodontida	Rhynchodus	excavatus	Givetian	80*	Denison 1978
Placodermi	Ptyctodontida	Rhynchodus	rostratus	Givetian	96*	Denison 1978
Placodermi	Petalichthyida	Ellopetalichthys	scheii	Givetian	18*	Denison 1978
Placodermi	Arthrodira	Deirosteus	omaliusii	Givetian-Famennian	200*	Wells 1942
Placodermi	Arthrodira	Eastmanosteus	pustulosus	Givetian-Frasnian	170*	Denison 1978
Placodermi	Arthrodira	Eastmanosteus	yunnanensis	Givetian	110*	Denison 1978
Placodermi	Arthrodira	Holonema	farrowi	Givetian	96*	Denison 1978
Placodermi	Arthrodira	Kiangyousteus	yohii	Givetian	120*	Denison 1978
Placodermi	Arthrodira	Rhenonema	eifelense	Givetian	300*	Denison 1978
Placodermi	Arthrodira	Tropidosteus	curvatus	Givetian	210*	Denison 1978
Placodermi	Antiarcha	Grossaspis	carinata	Givetian	32*	Denison 1978
Placodermi	Antiarcha	Microbranchius	dicki	Givetian	6	Frickhinger 1991
Placodermi	Arthrodira	Watsonosteus	fletti	Givetian-Frasnian	58	Frickhinger 1991
Placodermi	Arthrodira	Groenlandaspis	antarcticus	Givetian	70*	Ritchie 1975
Placodermi	Arthrodira	Groenlandaspis	sp.	Givetian	60*	Ritchie 1975
Placodermi	Phyllolepid	Antarctaspis	mcmurdoensis	Givetian	40*	Denison 1978
Placodermi	Phyllolepid	New phlyctaeniid	sp.	Givetian	30*	Young & Long 2005
Placodermi	Arthrodira	Antarctolepis	gunni	Givetian	45*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	perija	Givetian	24*	Young & Moody 2002
Placodermi	Antiarcha	Bothriolepis	gippslandensis	Givetian	43*	Long 1983
Placodermi	Antiarcha	Bothriolepis	cullodensis	Givetian	50*	Long 1983
Placodermi	Antiarcha	Bothriolepis	bindareei	Givetian	15*	Long 1983
Placodermi	Antiarcha	Bothriolepis	fergusoni	Givetian	30*	Long 1983
Placodermi	Antiarcha	Bothriolepis	warreni	Givetian	11*	Long 1983
Placodermi	Antiarcha	Bothriolepis	kassini	Givetian	22*	Moloshnikov 2010
Placodermi	Antiarcha	Bothriolepis	babichevi	Givetian	37*	Moloshnikov 2010
Placodermi	Antiarcha	Bothriolepis	askinae	Givetian	54*	Young 1988
Placodermi	Antiarcha	Bothriolepis	antarctica	Givetian	7.9*	Young 1988
Placodermi	Antiarcha	Bothriolepis	portalensis	Givetian	67*	Young 1988
Placodermi	Antiarcha	Bothriolepis	alexi	Givetian	45*	Young 1988
Placodermi	Antiarcha	Bothriolepis	karawaka	Givetian	45*	Young 1988
Placodermi	Antiarcha	Bothriolepis	macphersoni	Givetian	50*	Young 1988
Placodermi	Antiarcha	Bothriolepis	vuwae	Givetian	50*	Young 1988
Placodermi	Antiarcha	Bothriolepis	barretti	Givetian	30*	Young 1988
Placodermi	Antiarcha	Bothriolepis	curonica	Givetian-Frasnian	82*	Luksevics 2001
Placodermi	Arthrodira	Angarichthys	hyperboreus	Givetian	230*	Denison 1978
Placodermi	Antiarcha	Asterolepis	clarkei	Givetian	10*	Denison 1978
Placodermi	Antiarcha	Asterolepis	thule	Givetian	32*	Denison 1978
Placodermi	Antiarcha	Asterolepis	orcadensis	Givetian-Frasnian	190*	Denison 1978
Placodermi	Antiarcha	Asterolepis	dellei	Givetian	28*	Denison 1978
Placodermi	Antiarcha	Asterolepis	scabra	Givetian	40	Denison 1978
Placodermi	Arthrodira	Belgiosteus	mortelmansi	Givetian	360*	Denison 1978

Placodermi	Arthrodira	Livosteus	grandis	Givetian	210*	Denison 1978
Placodermi	Arthrodira	Protitanichthys	rockportensis	Givetian	110*	Denison 1978
Placodermi	Antiarcha	Gerdalepis	rhenana	Givetian	27*	Denison 1978
Placodermi	Antiarcha	Gerdalepis	dohmi	Givetian-Frasnian	69*	Denison 1978
Placodermi	Antiarcha	Venezuelepis	antarctica	Givetian	14*	Young & Moody 2002
Placodermi	Antiarcha	Venezuelepis	mingi	Givetian	15*	Young & Moody 2002
Placodermi	Phyllolepid	Placolepis	harjica	Givetian	27*	Young 2005
Placodermi	Phyllolepid	Placolepis	tingeyi	Givetian	110*	Young & Long 2005
Placodermi	Arthrodira	Beyrichosteus	radiatus	Givetian	52*	Otto 2005
Placodermi	Phyllolepid	Cowralepis	mclachlani	Givetian	10.5	Carr et al. 1990
Placodermi	Ptyctodontida	Ptyctodopsis	menzeli	Givetian	7	Denison 1985
Placodermi	Phyllolepid	Austrophyllolepis	quiltyi	Givetian	22*	Young & Long 2005
Placodermi	Phyllolepid	Austrophyllolepis	ritchiei	Givetian	25*	Young & Long 2005
Placodermi	Phyllolepid	Austrophyllolepis	youngi	Givetian	20*	Young & Long 2005
Placodermi	Arthrodira	Boomeraspis	goujeti	Givetian	55*	Long 1995
Placodermi	Arthrodira	Pluordosteus	livonicus	Givetian-Frasnian	73*	Denison 1978
Placodermi	Arthrodira	Pluordosteus	panderi	Givetian-Frasnian	170*	Denison 1978
Placodermi	Antiarcha	Grossilepis	spinosa	Givetian	21*	Luksevics 2001
Placodermi	Antiarcha	Taenolepis	speciosa	Givetian	37*	Denison 1978
Placodermi	Phyllolepid	Cobranrahlepis	petyrwardi	Givetian-Frasnian	22*	Young 2005
Placodermi	Phyllolepid	Yurammia	browni	Givetian-Frasnian	16*	Young 2005
Placodermi	Antiarcha	Vukhulepis	lyhoaensis	Givetian	10*	Janvier et al. 1997
Placodermi	Antiarcha	Vietnamaspis	trii	Givetian	40*	Long et al. 1990
Placodermi	Arthrodira	Yinosteus	major	Givetian	18*	Wang & Wang 1984
Placodermi	Arthrodira	Panxiosteus	oculus	Givetian-Frasnian	38*	Wang 1979
Placodermi	Antiarcha	Lepadolepis	stensioei	Givetian-Frasnian	37*	Denison 1978
Placodermi	Antiarcha	Asterolepis	ornata	Givetian-Frasnian	49*	Denison 1978
Placodermi	Petalichthyida	Epipetalichthys/Desmoporella	minor	Givetian	11*	Denison 1978
Placodermi	Arthrodira	Clarkosteus	halmodeus	Givetian-Frasnian	57*	Denison 1978
Placodermi	Antiarcha	Nawagiaspis	wadeae	Givetian	31*	Young 1990
Placodermi	Antiarcha	Asperaspis	carinata	Givetian	30*	Panteleyev 1993
Placodermi	Antiarcha	Stegolepis	jugata	Givetian-Frasnian	34*	Denison 1978
Placodermi	Antiarcha	Tenizolepis	asiatica	Givetian-Frasnian	69*	Moloshnikov 2010
Placodermi	Antiarcha	Tenizolepis	rara	Givetian-Frasnian	31*	Moloshnikov 2011
Placodermi	Arthrodira	Dinichthys	ohioensis	Givetian	72*	Skeels 1962
Placodermi	Ptyctodontida	Gamphacanthus	politus	Givetian	180*	Eastman 1907
Placodermi	Ptyctodontida	Acantholepis	pustulosus	Givetian	93*	Newberry 1889
Placodermi	Ptyctodontida	Acantholepis	fragilis	Givetian	210*	Eastman 1907
Placodermi	Ptyctodontida	Ctenurella	gladbachensis	Frasnian	18	Denison 1978
Placodermi	Ptyctodontida	Denisonodus	plutonensis	Frasnian	28*	Johnson & Elliott 1996
Placodermi	Rhenanida	Jagorina	pandora	Frasnian	37*	Denison 1978

Placodermi	Ptyctodontida	Palaeomylus	hussakofi	Frasnian	230*	Denison 1978
Placodermi	Ptyctodontida	Palaeomylus	lunaeformis	Frasnian	150*	Denison 1978
Placodermi	Ptyctodontida	Palaeomylus	minor	Frasnian	48*	Denison 1978
Placodermi	Ptyctodontida	Ptyctodus	bradyi	Frasnian	32*	Denison 1978
Placodermi	Ptyctodontida	Ptyctodus	czarnockii	Frasnian	110*	Denison 1978
Placodermi	Ptyctodontida	Ptyctodus	kielcensis	Frasnian	63*	Denison 1978
Placodermi	Ptyctodontida	Rhynchodus	marginalis	Frasnian	96*	Denison 1978
Placodermi	Ptyctodontida	Rhynchodus	tetradon	Frasnian	63*	Denison 1978
Placodermi	Petalichthyida	Epipetalichthys	wildungensis	Frasnian	48*	Denison 1978
Placodermi	Arthrodira	Aspidichthys	clavatus	Frasnian	200*	Denison 1978
Placodermi	Arthrodira	Aspidichthys	ingens	Frasnian	190*	Denison 1978
Placodermi	Arthrodira	Belosteus	elegans	Frasnian	68*	Denison 1978
Placodermi	Arthrodira	Brachydeirus	carinatus	Frasnian	65*	Denison 1978
Placodermi	Arthrodira	Brachydeirus	bicarinatus	Frasnian	48*	Denison 1978
Placodermi	Arthrodira	Brachydeirus	gracilis	Frasnian	33*	Denison 1978
Placodermi	Arthrodira	Brachydeirus	grandis	Frasnian	110*	Denison 1978
Placodermi	Arthrodira	Brachydeirus	minor	Frasnian	40*	Denison 1978
Placodermi	Arthrodira	Brachyosteus	deitrichi	Frasnian	27*	Denison 1978
Placodermi	Arthrodira	Braunosteus	schmidti	Frasnian	50*	Denison 1978
Placodermi	Arthrodira	Bruntonichthys	multidens	Frasnian	48*	Dennis & Miles 1979
Placodermi	Arthrodira	Bullerichthys	fascidens	Frasnian	44*	Dennis & Miles 1979
Placodermi	Arthrodira	Callognathus	regularis	Frasnian-Famennian	50*	Denison 1978
Placodermi	Arthrodira	Camuropiscus	concinnus	Frasnian	32*	Dennis & Miles 1979
Placodermi	Arthrodira	Camuropiscus	laidlowi	Frasnian	15*	Dennis & Miles 1979
Placodermi	Arthrodira	Copanognathus	crassus	Frasnian	200*	Denison 1978
Placodermi	Arthrodira	Cyrtosteus	inflatus	Frasnian	21*	Denison 1978
Placodermi	Arthrodira	Dinichthys	herzeri	Frasnian	700*	Denison 1978
Placodermi	Arthrodira	Dinomylostoma	beecheri	Frasnian	130*	Denison 1978
Placodermi	Arthrodira	Dinomylostoma	eastmani	Frasnian-Famennian	72*	Denison 1978
Placodermi	Arthrodira	Dunkleosteus	magnificus	Frasnian	340*	Denison 1978
Placodermi	Arthrodira	Dunkleosteus	newberryi	Frasnian	350*	Eastman 1907
Placodermi	Arthrodira	Eastmanosteus	calliaspis	Frasnian	89*	Long and Trinajstic 2010
Placodermi	Arthrodira	Eldenosteus	arizonensis	Frasnian	360*	Denison 1978
Placodermi	Arthrodira	Enseosteus	jaekeli	Frasnian	32*	Denison 1978
Placodermi	Arthrodira	Enseosteus	hermanni	Frasnian	27*	Denison 1978
Placodermi	Arthrodira	Enseosteus	pachyostiodes	Frasnian	27*	Denison 1978
Placodermi	Arthrodira	Enseosteus	marocanensis	Frasnian	25*	Ruecklin 2011
Placodermi	Arthrodira	Erromenosteus	lucifer	Frasnian	76*	Denison 1978
Placodermi	Arthrodira	Erromenosteus	brachyrostris	Frasnian	32*	Denison 1978
Placodermi	Arthrodira	Erromenosteus	concavus	Frasnian	71*	Denison 1978
Placodermi	Arthrodira	Erromenosteus	diensti	Frasnian	64*	Denison 1978
Placodermi	Arthrodira	Erromenosteus	inflatus	Frasnian	43*	Denison 1978
Placodermi	Arthrodira	Erromenosteus	koeneni	Frasnian	300*	Denison 1978
Placodermi	Arthrodira	Fallacosteus	turnerae	Frasnian	36*	Long 1990
Placodermi	Arthrodira	Hadrosteus	rapax	Frasnian	86*	Denison 1978
Placodermi	Arthrodira	Harrytoombsia	sp.	Frasnian	53*	Long 1990
Placodermi	Arthrodira	Heinzichthys	ringueberryi	Frasnian	53*	Denison 1978
Placodermi	Arthrodira	Holonema	westolli	Frasnian	88*	Denison 1978
Placodermi	Arthrodira	Holonema	radiatum	Frasnian	150*	Denison 1978
Placodermi	Arthrodira	Holonema	rugosum	Frasnian	88*	Denison 1978

Placodermi	Arthrodira	Kendrichthys	cavernosus	Frasnian	85*	Dennis & Miles 1980
Placodermi	Arthrodira	Kimberia	whybrowi	Frasnian	71*	Dennis-Bryan & Miles 1983
Placodermi	Arthrodira	Kimberia	bispicatus	Frasnian	110*	Dennis-Bryan & Miles 1983
Placodermi	Arthrodira	Leptosteus	bickensis	Frasnian	36*	Denison 1978
Placodermi	Arthrodira	Leptosteus	involutus	Frasnian	30*	Denison 1978
Placodermi	Arthrodira	Machaerognathus	woodwardi	Frasnian	210*	Denison 1978
Placodermi	Arthrodira	Malerosteus	gorizdroae	Frasnian	110*	Denison 1978
Placodermi	Arthrodira	Microsteus	dubius	Frasnian	27*	Denison 1978
Placodermi	Arthrodira	Pachyosteus	bulla	Frasnian-Famennian	54*	Denison 1978
Placodermi	Arthrodira	Parabelosteus	pusillus	Frasnian	32*	Denison 1978
Placodermi	Arthrodira	Parabelosteus	acuticeps	Frasnian	32*	Denison 1978
Placodermi	Arthrodira	Pholidosteus	friedeli	Frasnian	40*	Denison 1978
Placodermi	Arthrodira	Pluordosteus	sp.	Frasnian	100*	Denison 1978
Placodermi	Arthrodira	Pluordosteus	canadensis	Frasnian	87*	Denison 1978
Placodermi	Arthrodira	Pluordosteus	mironovi	Frasnian	59*	Denison 1978
Placodermi	Arthrodira	Pluordosteus	trautscholdi	Frasnian	65*	Denison 1978
Placodermi	Arthrodira	Pluordosteus	timanicus	Frasnian-Famennian	87*	Denison 1978
Placodermi	Arthrodira	Rachiosteus	pterygiats	Frasnian	100*	Denison 1978
Placodermi	Arthrodira	Rhinosteus	traquairi	Frasnian	60*	Denison 1978
Placodermi	Arthrodira	Rhinosteus	parvulus	Frasnian	32*	Denison 1978
Placodermi	Arthrodira	Rhinosteus	tuberculatus	Frasnian	81*	Denison 1978
Placodermi	Arthrodira	Rolfosteus	canningensis	Frasnian	46*	Dennis & Miles 1979
Placodermi	Arthrodira	Synauchernia	coalescens	Frasnian	25*	Denison 1978
Placodermi	Arthrodira	Trematosteus	fontanellus	Frasnian	22*	Denison 1978
Placodermi	Arthrodira	Tapinosteus	heintzi	Frasnian	24*	Denison 1978
Placodermi	Arthrodira	Timanosteus	techernychevi	Frasnian	72*	Denison 1978
Placodermi	Arthrodira	Torosteus	tuberculatus	Frasnian	40*	Gardiner & Miles 1990
Placodermi	Arthrodira	Torosteus	pulchellus	Frasnian	31*	Dennis & Miles 1979
Placodermi	Arthrodira	Tubonasis	lennardensis	Frasnian	32*	Dennis & Miles 1979
Placodermi	Antiarcha	Bothriolepis	prima	Frasnian	17*	Luksevics 2001
Placodermi	Antiarcha	Bothriolepis	obrutschewi	Frasnian	29*	Luksevics 2001
Placodermi	Antiarcha	Bothriolepis	cellulosa	Frasnian	66*	Luksevics 2001
Placodermi	Antiarcha	Bothriolepis	panderi	Frasnian	43*	Luksevics 2001
Placodermi	Antiarcha	Bothriolepis	traudscholi	Frasnian	48*	Luksevics 2001
Placodermi	Antiarcha	Bothriolepis	maxima	Frasnian	170*	Luksevics 2001
Placodermi	Antiarcha	Bothriolepis	evaldi	Frasnian	17*	Luksevics 2001
Placodermi	Antiarcha	Bothriolepis	leptocheira	Frasnian-Famennian	82*	Luksevics 2001
Placodermi	Antiarcha	Bothriolepis	canadensis	Frasnian	46*	Werdelin & Long 1986
Placodermi	Antiarcha	Bothriolepis	favosa	Frasnian	56*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	hayi	Frasnian-Famennian	51*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	major	Frasnian	41*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	obesa	Frasnian-Famennian	66*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	taylori	Frasnian	61*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	wilsoni	Frasnian-Famennian	72*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	sanzarensis	Frasnian	76*	Moloshnikov 2010
Placodermi	Antiarcha	Bothriolepis	volongensis	Frasnian	48*	Denison 1978

Placodermi	Antiarcha	Asterolepis	chadwicki	Frasnian	57*	Denison 1978
Placodermi	Antiarcha	Asterolepis	savesoederberghi	Frasnian	49*	Denison 1978
Placodermi	Antiarcha	Asterolepis	maxima	Frasnian-Famennian	98*	Denison 1978
Placodermi	Arthrodira	Neophlyctenius	sherwoodi	Frasnian	50*	Denison 1978
Placodermi	Antiarcha	Grossilepis	tuberculata	Frasnian	26*	Luksevics 2001
Placodermi	Arthrodira	Walterosteus	lelievrei	Frasnian	29*	Ruecklin 2011
Placodermi	Arthrodira	Omalosteus	krutoensis	Frasnian	65*	Zakharenko 2007
Placodermi	Ptyctodontida	Materpiscis	attenboroughi	Frasnian	18.7	Long et al. 2009
Placodermi	Arthrodira	Mcnamaraspis	kaprios	Frasnian	35*	Long and Trinajstic 2010
Placodermi	Arthrodira	Simosteus	tuberculatus	Frasnian	68*	Dennis & Miles 1982
Placodermi	Arthrodira	Compagopiscis	croucheri	Frasnian	36*	Gardiner & Miles 1994
Placodermi	Arthrodira	Golshanichthys	asiatica	Frasnian	140*	Long 1987
Placodermi	Arthrodira	Gogopiscus	gracilis	Frasnian	35*	Gardiner & Miles 1994
Placodermi	Arthrodira	Gogosteus	sarahae	Frasnian	44*	Long 1994
Placodermi	Arthrodira	Pinguosteus	thulborni	Frasnian	48*	Long 1990
Placodermi	Arthrodira	Stenosteus	pertensis	Frasnian	73*	Denison 1978
Placodermi	Petalichthyida	Changyanophyton	hupeiense	Frasnian	30*	Denison 1978
Placodermi	Phyllolepid	Placolepis	budawangensis	Frasnian	8.3	Young et al. 2000
Placodermi	Arthrodira	Deirosteus	abbreviata	Frasnian	190*	Denison 1978
Placodermi	Antiarcha	Pambulaspis	cobandraensis	Frasnian	44*	Young 1983
Placodermi	Arthrodira	Cosmacanthus	malcolmsoni	Frasnian	150*	Newman 2005
Placodermi	Arthrodira	Draconichthys	elegans	Frasnian	64*	Ruecklin 2011
Placodermi	Arthrodira	Dinicthydae	indet.	Frasnian	68*	Lelievre 1981
Placodermi	Ptyctodontida	Chelyophorous	verneuli	Famennian	10	Denison 1978
Placodermi	Ptyctodontida	Ptyctodus	major	Famennian	160*	Denison 1978
Placodermi	Arthrodira	Africanaspis	doryssa	Famennian	37*	Long et al. 1997
Placodermi	Arthrodira	Bungartius	perissus	Famennian	200*	Denison 1978
Placodermi	Arthrodira	Diplognathus	mirabilis	Famennian	540*	Denison 1978
Placodermi	Arthrodira	Diplognathus	lafargei	Famennian	44*	Carr & Jackson 2005
Placodermi	Arthrodira	Dunkleosteus	terrelli	Famennian	800	Denison 1978
Placodermi	Arthrodira	Dunkleosteus	denisoni	Famennian	52*	Kulczycki 1957
Placodermi	Arthrodira	Dunkleosteus	missouriensis	Famennian	190*	Branson 1914
Placodermi	Arthrodira	Dunkleosteus	marsaisi	Famennian	190*	Denison 1978
Placodermi	Arthrodira	Eastmanosteus	tubercultatus	Famennian	120*	Dennis-Bryan 1987
Placodermi	Arthrodira	Glyptaspis	verrucosa	Famennian	800*	Denison 1978
Placodermi	Arthrodira	Gorgonichthys	clarki	Famennian	390*	Denison 1978
Placodermi	Arthrodira	Groenlandaspis	riniensis	Famennian	90*	Long et al. 1997
Placodermi	Arthrodira	Groenlandaspis	mirabilis	Famennian	110*	Daeschler and Frumes 2003
Placodermi	Arthrodira	Groenlandaspis	thorezi	Famennian	24*	Clement and Janvier 2005
Placodermi	Arthrodira	Groenlandaspis	pennsylvanica	Famennian	100*	Daeschler and Frumes 2003
Placodermi	Arthrodira	Groenlandaspis	disjectus	Famennian	85*	Daeschler and Frumes 2003
Placodermi	Arthrodira	Gymnotrachelus	hydei	Famennian	84*	Denison 1978
Placodermi	Arthrodira	Heinzichthys	gouldi	Famennian	140*	Denison 1978
Placodermi	Arthrodira	Holdenius	holdeni	Famennian	590*	Denison 1978
Placodermi	Arthrodira	Hussakofia	minor	Famennian	96*	Denison 1978

Placodermi	Arthrodira	Mylostoma	varibile	Famennian	120*	Denison 1978
Placodermi	Arthrodira	Paramylostoma	arcualis	Famennian	71*	Denison 1978
Placodermi	Arthrodira	Selenosteus	brevis	Famennian	87*	Denison 1978
Placodermi	Arthrodira	Stenosteus	glaber	Famennian	110*	Denison 1978
Placodermi	Arthrodira	Tafilalichthys	lavocati	Famennian	130*	Denison 1978
Placodermi	Arthrodira	Titanichthys	agassizi	Famennian	490*	Denison 1978
Placodermi	Arthrodira	Titanichthys	attenuatus	Famennian	440*	Denison 1978
Placodermi	Arthrodira	Titanichthys	clarkii	Famennian	490*	Newberry 1889
Placodermi	Arthrodira	Titanichthys	kozlowskii	Famennian	500*	Kulczycki 1957
Placodermi	Arthrodira	Titanichthys	termieri	Famennian	120*	Denison 1978
Placodermi	Arthrodira	Trachosteus	clarki	Famennian	75*	Denison 1978
Placodermi	Antiarcha	Sinolepis	macrocephala	Famennian	32*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	alvensis	Famennian	46*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	cristata	Famennian	35*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	gigantea	Famennian	97*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	groenlandica	Famennian	85*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	lohesti	Famennian	19*	Denison 1978
Placodermi	Antiarcha	Bothriolepis	paradoxa	Famennian	48*	Denison 1978
Placodermi	Antiarcha	Remigolepis	cristata	Famennian	24*	Denison 1978
Placodermi	Antiarcha	Remigolepis	acusta	Famennian	48*	Denison 1978
Placodermi	Antiarcha	Remigolepis	kochi	Famennian	35*	Denison 1978
Placodermi	Phyllolepid	Phyllolepis	tolli	Famennian	50*	Denison 1978
Placodermi	Arthrodira	Dinichthys	corrugatus	Famennian	180*	Branson 1914
Placodermi	Arthrodira	Turrisaspis	elektor	Famennian	22*	Daeschler et al. 2003
Placodermi	Arthrodira	Tiaraspis	subtilis	Famennian	110*	Daeschler and Frumes 2003
Placodermi	Antiarcha	Hillalepis	gippslandensis	Famennian	20*	Denison 1978
Placodermi	Antiarcha	Livnolepis	zadonica	Famennian	80	Moloshnikov 2008
Placodermi	Antiarcha	Kirgisolepis	karabaltaensis	Famennian	46*	Vorobyeva & Panteleyev 2005
Placodermi	Antiarcha	Ningxialepis	spinosa	Famennian	11.5	Jia et al. 2010
Sarcopterygii	Porolepiformes	Youngolepis	sp.	Lochkovian	50	Long 2011
Sarcopterygii	Porolepiformes	Youngolepis	praecursor	Lochkovian-Pragian	30*	Wang et al. 2010
Sarcopterygii	Dipnoi	Powichthys	sp.	Lochkovian	50	Long 2011
Sarcopterygii	NA	Psarolepis	romeri	Lochkovian	13*	Yu 1998
Sarcopterygii	NA	Achoania	jarviki	Lochkovian	16*	Zhu et al. 2001
Sarcopterygii	NA	Styloichthys	changae	Lochkovian	16*	Zhu & Yu 2002
Sarcopterygii	NA	Meemania	eos	Lochkovian	10*	Zhao & Zhu 2010
Sarcopterygii	Dipnoi	Diabolepis	speratus	Lochkovian	15*	Chang & Yu 1984
Sarcopterygii	Dipnoi	Westollrhynchus	lehmani	Pragian-Emsian	69*	Schultze 2001
Sarcopterygii	Onychodont	Qingmenodus	yui	Pragian	70	Long 2011
Sarcopterygii	Onychodont	Bukkanodus	jesseni	Pragian	20	Long 2011
Sarcopterygii	Actinista	Euporosteus	yunnanensis	Pragian	12*	Zhu et al. 2012
Sarcopterygii	Dipnoi	Uranolophus	wyomingensis	Pragian-Emsian	30	Frickhinger 1991
Sarcopterygii	Dipnoi	Dipnorhynchus	sussmilchi	Emsian	57.8	Bernacsek & Carroll 1981
Sarcopterygii	Dipnoi	Dipnorhynchus	cathlesae	Emsian	140*	Campbell et al. 2009
Sarcopterygii	Dipnoi	Speonedydrion	iani	Emsian	55*	Chang & Wang 1995
Sarcopterygii	Dipnoi	Cathlorhynchus	trismodipterus	Emsian	28*	Campbell et al. 2009
Sarcopterygii	Dipnoi	Erikia	jarviki	Emsian	15*	Chang & Wang

							1995
Sarcopterygii	Dipnoi	Tarachomylax	oepiki	Emsian		17*	Barwick et al. 1997
Sarcopterygii	Osteolepiformes	New Osteolepiform	sp.	Emsian-Eifelian	24*		Hunt & Young 2012
Sarcopterygii	Dipnoi	Melanognathus	canadensis	Emsian	36*		Schultze 2001
Sarcopterygii	Porolepiformes	Nasogaluakus	chorni	Emsian	51*		Schultze 2000
Sarcopterygii	Dipnoi	Sorbitohynchus	deleaslkitus	Emsian	76*		Wang et al. 1990
Sarcopterygii	Tetrapodamorpha	Kenichthys	campbelli	Emsian	10*		Zhao & Zhu 2010
Sarcopterygii	Porolepiformes	Porolepis	brevis	Eifelian	20		Frickhinger 1991
Sarcopterygii	Dipnoi	Dipterus	valenciennessii	Eifelian-Frasnian	30		Frickhinger 1991
Sarcopterygii	Porolepiformes	Gyroptychius	agassizi	Eifelian-Givetian	30		Frickhinger 1991
Sarcopterygii	Porolepiformes	Glyptolepis	paucidens	Eifelian-Givetian	62		Frickhinger 1991
Sarcopterygii	Porolepiformes	Glyptolepis	leptopterus	Eifelian-Givetian	70*		Vorobyeva 2006
Sarcopterygii	Osteolepiformes	Thursius	macrolepidotus	Eifelian		12	Dineley 1999
Sarcopterygii	Osteolepiformes	Thursius	talsiensis	Eifelian		8*	Vorobyeva 1977
Sarcopterygii	Osteolepiformes	Thursius	fischeri	Eifelian		9*	Vorobyeva 1977
Sarcopterygii	Osteolepiformes	Osteolepis	macrolepidotus	Eifelian-Givetian		18	Frickhinger 1991
Sarcopterygii	Porolepiformes	Holoptychius	sp.	Eifelian	57*		Moy-Thomas & Miles 1971
Sarcopterygii	Dipnoi	Dongshanodus	qujingensis	Eifelian-Givetian		18*	Wang 1981
Sarcopterygii	Dipnoi	Sinodipterus	beibei	Eifelian	15*		Qiao & Zhu 2009
Sarcopterygii	Dipnoi	Pinnalongus	saxoni	Eifelian-Givetian	30		Newman & Den Blaauwen 2007
Sarcopterygii	Dipnoi	Amadeodipterus	kencampbelli	Eifelian-Givetian		23*	Clement 2009
Sarcopterygii	Onychodont	Luckeus	abudda	Eifelian-Givetian	38*		Young & Schultze 2005
Sarcopterygii	Dipnoi	Dipterus	marginalis	Givetian-Famennian	29*		Eastman 1907
Sarcopterygii	Dipnoi	Dipterus	uddeni	Givetian	24*		Eastman 1907
Sarcopterygii	Dipnoi	Dipterus	calvini	Givetian		24*	Eastman 1907
Sarcopterygii	Onychodont	Onychodus	sigmoides	Givetian	150*		Newberry 1889
Sarcopterygii	Osteolepiformes	Thursius	pholidotus	Givetian	19		Frickhinger 1991
Sarcopterygii	Dipnoi	Pentlandia	macroptera	Givetian	12		Frickhinger 1991
Sarcopterygii	Osteolepiformes	Tristichopterus	alatus	Givetian	28		Frickhinger 1991
Sarcopterygii	Rhizodontida	Notorhizodon	mackelevyi	Givetian-Frasnian	300*		Young et al. 1992
Sarcopterygii	Porolepiformes	Laccognathus	panderi	Givetian-Frasnian	200*		Vorobyeva 2006
Sarcopterygii	Porolepiformes	Laccognathus	grossi	Givetian		70*	Vorobyeva 2006
Sarcopterygii	Osteolepiformes	Koharalepis	jarviki	Givetian		100*	Young et al. 1992
Sarcopterygii	Osteolepiformes	Vorobjevaia	dolodon	Givetian		55*	Young et al. 1992
Sarcopterygii	Dipnoi	Cheirodipterus	onaweyensis	Givetian	73*		Schultze 1982
Sarcopterygii	Actinista	Miguashaia	grossi	Givetian-Frasnian	110*		Forey et al. 2000
Sarcopterygii	Dipnoi	Iowadipterus	halli	Givetian	57*		Young et al. 1992
Sarcopterygii	Osteolepiformes	Mahalepis	resima	Givetian	61*		Schultze 1992

Sarcopterygii	Osteolepiformes	Platyethmoidia	antarctica	Givetian	52*	Young et al. 1992
Sarcopterygii	Osteolepiformes	Eusthenopteron	kurshi	Givetian	36.6*	Zupins 2008
Sarcopterygii	Dipnoi	Grossipterus	crassus	Givetian	91*	Vorobyeva & Obruchev 1967
Sarcopterygii	Rhizodontida	Aztecia	mahalae	Givetian	90*	Johanson & Ahlberg 2001
Sarcopterygii	Actinista	Dictyonosteus	arcticus	Givetian	200*	Stensio 1922
Sarcopterygii	Dipnoi	Rhinodipterus	sp.	Givetian	11*	Vorobyeva & Obruchev 1967
Sarcopterygii	Dipnoi	Barwickia	downnunda	Givetian	27*	Long 1992
Sarcopterygii	Dipnoi	Harajicadipterus	youngi	Givetian	17*	Clement 2009
Sarcopterygii	Osteolepiformes	Owensia	chooi	Givetian	18*	Holland 2009
Sarcopterygii	Dipnoi	Soederberghia	sp.	Givetian	27*	Schultze 2010
Sarcopterygii	Osteolepiformes	Bruenhopteron	murphyi	Givetian	45*	Schultze & Reed 2012
Sarcopterygii	Dipnoi	Dipnotuberculus	gnathodus	Givetian	100*	Campbell & Barwick 2008
Sarcopterygii	Porolepiformes	Paraglyptolepis	karkiensis	Givetian	19*	Vorobyeva 1987
Sarcopterygii	Dipnoi	Tristichopterid rhipidistian	indet.	Givetian	50*	Schultze 2010
Sarcopterygii	Dipnoi	Chirodipterus	wildungensis	Frasnian	36.7*	Bernacsek & Carroll 1981
Sarcopterygii	Dipnoi	Holodipterus	gogoensis	Frasnian	41*	Frickhinger 1991
Sarcopterygii	Dipnoi	Pillararhynchus	longi	Frasnian	25*	Campbell & Barwick 1009
Sarcopterygii	Actinista	Diplocerides	jaekeli	Frasnian	26	Stensio 1922
Sarcopterygii	Osteolepiformes	Eusthenopteron	foordi	Frasnian	60	Frickhinger 1991
Sarcopterygii	Porolepiformes	Holoptychius	jarviki	Frasnian	37.5*	Cloutier & Schultze 1996
Sarcopterygii	Porolepiformes	Holoptychius	bergmanni	Frasnian	73*	Vorobyeva and Obruchev 1967
Sarcopterygii	Porolepiformes	Holoptychius	nobilissimus	Frasnian-Famennian	73*	Downs et al. 2013
Sarcopterygii	Porolepiformes	Holoptychius	sp.	Frasnian	95*	Vorobyeva & Obruchev 1967
Sarcopterygii	Onychodont	Onychodus	firouzi	Frasnian	98*	Janvier & Martin 1979
Sarcopterygii	Onychodont	Onychodus	jandemmarrai	Frasnian	95	Andrews et al. 2006
Sarcopterygii	Dipnoi	Scaumenacia	curta	Frasnian	64.6	Frickhinger 1991
Sarcopterygii	Dipnoi	Fleurantia	denticulata	Frasnian	42	Cloutier 1996
Sarcopterygii	Porolepiformes	Quebecius	quebecensis	Frasnian	6*	Frickhinger 1991
Sarcopterygii	Dipnoi	Spodichthys	buetleri	Frasnian	23*	Snitting 2008
Sarcopterygii	Osteolepiformes	Platycephalichthys	bischoffi	Frasnian	400	Vorobyeva & Obruchev 1967
Sarcopterygii	Osteolepiformes	Jarvikina	wenjukowi	Frasnian	95*	Vorobyeva 1977
Sarcopterygii	Actinista	Callistiopterus	clappi	Frasnian	7*	Frickhinger 1991
Sarcopterygii	Porolepiformes	Laccognathus	embryi	Frasnian	62*	Downs et al. 2011
Sarcopterygii	Osteolepiformes	Sengoerichthys	ottomani	Frasnian	24*	Janvier et al. 2007
Sarcopterygii	Dipnoi	Rhinodipterus	ulrichi	Frasnian	24*	Schultze 1992
Sarcopterygii	Actinista	Holopterygius	nudus	Frasnian	28	Friedman & Coates 2006
Sarcopterygii	Osteolepiformes	Latvius	grewingki	Frasnian	30*	Vorobyeva & Obruchev 1967
Sarcopterygii	Dipnoi	Iranorhynchus	seysdemamii	Frasnian	60	Janvier & Martin 1979
Sarcopterygii	Osteolepiformes	Megistolepis	klementzi	Frasnian	200*	Vorobyeva & Obruchev 1967

Sarcopterygii	Dipnoi	Griphognathus	whitei	Frasnian	75		Campbell & Barwick 1986
Sarcopterygii	Actinista	Nesides	schmidti	Frasnian		20*	Vorobyeva & Obruchev 1967
Sarcopterygii	Dipnoi	Asthenorhynchus	meemanae	Frasnian	60		Long 2010
Sarcopterygii	Dipnoi	Xeradipterus	hatcheri	Frasnian		35	Clement & Long 2010
Sarcopterygii	Dipnoi	Chirodipterus	australis	Frasnian	40.8		Bernacsek & Carroll 1981
Sarcopterygii	Osteolepiformes	Marsdenichthys	longioccipitus	Frasnian		58*	Long 1985b
Sarcopterygii	Dipnoi	Robinsondipterus	longi	Frasnian	79*		Long 2010
Sarcopterygii	Dipnoi	Howidipterus	donnae	Frasnian		43*	Long 1992
Sarcopterygii	Dipnoi	Eoctenodus	microsoma	Frasnian		31*	Long 1987
Sarcopterygii	Dipnoi	Soederberghia	simpsoni	Frasnian		21	Ahlberg et al. 2001
Sarcopterygii	Osteolepiformes	Panderichthys	rhombolepis	Frasnian	200		Vorobyeva & Obruchev 1967
Sarcopterygii	Actinista	Chagrinia	sp.	Famennian	10		Frickhinger 1991
Sarcopterygii	Osteolepiformes	Cryptolepis	grossi	Famennian	100*		Lebedev 1995
Sarcopterygii	Osteolepiformes	Glyptopomus	kinnairdi	Famennian	27		Vorobyeva & Obruchev 1967
Sarcopterygii	Osteolepiformes	Glyptopomus	minor	Famennian		60	Vorobyeva & Obruchev 1967
Sarcopterygii	Porolepiformes	Holoptychius	hallii	Famennian		90	Downs et al. 2013
Sarcopterygii	Porolepiformes	Holoptychius	radiatus	Famennian		60*	Vorobyeva & Obruchev 1967
Sarcopterygii	Osteolepiformes	Sterropterygion	markovskyi	Famennian	20*		Vorobyeva 1977
Sarcopterygii	Dipnoi	Jarvikia	arctica	Famennian		100*	Krupina 1999
Sarcopterygii	Dipnoi	Jarvikia	lebedevi	Famennian		72*	Krupina 1999
Sarcopterygii	Rhizodontida	Sauripterus	anglicus	Famennian		160*	Davis et al. 2004
Sarcopterygii	Dipnoi	Soederberghia	groenlandica	Famennian	180*		Schultze 1992
Sarcopterygii	Osteolepiformes	Eusthenodon	waengsjoei	Famennian	43		Schultze & Chorn 1998
Sarcopterygii	Osteolepiformes	Hyneria	lindae	Famennian	250*		Thomson 1968
Sarcopterygii	Dipnoi	Orlovichthys	limnatus	Famennian	28*		Krupina et al. 2001
Sarcopterygii	Dipnoi	Apatorhynchus	opistheretmus	Famennian	80		Friedman & Daeschler 2007
Sarcopterygii	Osteolepiformes	Canowindra	grossi	Famennian	52*		Frickhinger 1991
Sarcopterygii	Osteolepiformes	Mandageria	fairfaxi	Famennian		160	Johanson et al. 2003
Sarcopterygii	Osteolepiformes	Cabonnichthys	bursi	Famennian	74		Ahlberg & Johanson 1997
Sarcopterygii	Rhizodontida	Gooloogongia	loomesi	Famennian	89		Johanson & Ahlberg 1998
Sarcopterygii	Dipnoi	Phaneropleuron	andersoni	Famennian		33	Frickhinger 1991
Sarcopterygii	Dipnoi	Rhynchodipterus	elginensis	Famennian	50		Ahlberg et al. 2001
Sarcopterygii	Osteolepiformes	Sterropterygion	brandei	Famennian		38	Thomson 1972
Sarcopterygii	Osteolepiformes	Heddleichthys	dalgliensis	Famennian		50*	Snitting 2009
Sarcopterygii	Osteolepiformes	Langlieria	socqueti	Famennian		79	Clement et al. 2009
Sarcopterygii	Dipnoi	Sunwapta	grandiceps	Famennian		100	Thomson 1967
Sarcopterygii	Osteolepiformes	Uzunbulaklepis	obruchevi	Famennian		100*	Vorobyeva & Panteleyev 2005
Sarcopterygii	Osteolepiformes	Gyroptychius	pauli	Famennian		20*	Vorobyeva 1977
Sarcopterygii	Osteolepiformes	Edenopteron	kiethcrooki	Famennian	250		Young et al. 2013
Sarcopterygii	Osteolepiformes	Osteolepidid	indet.	Famennian		18.8	Schultze &

						Chorn 1998
Sarcopterygii	Osteolepiformes	Thursius	estonicus	Famennian	29*	Vorobyeva 1977
Sarcopterygii	NA	Viluichthys	fradkini	Famennian	59*	Vorobyeva 1977
Sarcopterygii	Osteolepiformes	Lamprotolepis	verrucosa	Famennian	45*	Vorobyeva 1977
Sarcopterygii	Rhizodontida	Barameda	decipiens	Tournaisian	200*	Garvey et al. 2005
Sarcopterygii	Dipnoi	Delatitia	breviceps	Tournaisian	80*	Long & Campbell 1985
Sarcopterygii	Rhizodontida	Strepsodus?	anculonamensis	Tournaisian	35*	Johanson & Ahlberg 1998
Sarcopterygii	Actinista	Rhabdoderma	sp.	Tournaisian	22	Dineley 1996
Sarcopterygii	Rhizodontida	Letognathus	hardingi	Tournaisian	92*	Brazeau 2005
Sarcopterygii	Rhizodontida	Pycnoctenion	jacuticus	Tournaisian	62*	Vorobyeva 1977
Sarcopterygii	Actinista	Coelacanthus	welleri	Tournaisian-Visean	19	Eastman 1908
Sarcopterygii	Osteolepiformes	Megalichthys	laticeps	Visean	27	Traquair 1884
Sarcopterygii	Rhizodontida	Strepsodus	sauroides	Visean-Serpukhovian	190*	Johanson et al. 2000
Sarcopterygii	Rhizodontida	Rhizodus	hibberti	Visean-Serpukhovian	700*	Vorobyeva & Obruchev 1967
Sarcopterygii	Actinista	Rhabdoderma	elegans	Visean-Serpukhovian	18	Forey 1981
Sarcopterygii	Actinista	Rhabdoderma	ardrossense	Visean	11.7	Forey 1981
Sarcopterygii	Actinista	Rhabdoderma	huxleyi	Visean-Serpukhovian	16	Forey 1981
Sarcopterygii	Actinista	Rhabdoderma	tingleyense	Visean	45	Forey 1981
Sarcopterygii	Actinista	Coelacanthopsis	curta	Visean	9	Frickhinger 1991
Sarcopterygii	Osteolepiformes	Cladarosymblea	narrienense	Visean	22*	Fox et al. 1995
Sarcopterygii	Rhizodontida	Floydus	punicellus	Visean	97*	Snyder 2006
Sarcopterygii	Rhizodontida	Screbinodus	ornatus	Visean-Serpukhovian	150	Jeffery 2012
Sarcopterygii	Dipnoi	Uronemus	splendens	Visean-Serpukhovian	70*	Smith et al. 1987
Sarcopterygii	Dipnoi	Straitonia	watersoni	Visean-Serpukhovian	50*	Sharp & Clack 2011
Sarcopterygii	Actinista	Allenypterus	montanus	Serpukhovian	15	Lund & Grogan 2005
Sarcopterygii	Actinista	Caridosuctor	populosum	Serpukhovian	25	Lund & Grogan 2005
Sarcopterygii	Actinista	Hadronector	donbairdi	Serpukhovian	12	Lund & Grogan 2005
Sarcopterygii	Actinista	Lochmocerceus	aciculodontus	Serpukhovian	10	Lund & Lund 1984
Sarcopterygii	Actinista	Polyosterohynchus	beargulchensis	Serpukhovian	15	Lund & Grogan 2005
Sarcopterygii	Rhizodontida	Rhizodopsis	sauroides	Serpukhovian	30	Moy-Thomas 1971
Sarcopterygii	Rhizodontida	Archichthys	sulcidens	Serpukhovian	91*	Jeffery 2006
Sarcopterygii	Rhizodontida	Unnamed	sp.	Serpukhovian	400	Garcia et al. 2006
Tetrapoda	NA	Panderichthys	rhombolepis	Givetian-Frasnian	100*	Ahlberg & Clack 1996
Tetrapoda	NA	Tiktaalik	roseae	Givetian-Frasnian	100*	Daeshler et al. 2006
Tetrapoda	NA	Parapanderichthys	stolbovi	Frasnian	150*	Vorobyeva 1977
Tetrapoda	NA	Elginerpeton	pancheni	Frasnian	230*	Ahlberg 1995
Tetrapoda	NA	Acanthostega	gunnari	Famennian	70*	Clack 2002
Tetrapoda	NA	Ichthyostega	stensoei	Famennian	130*	Blom 2005
Tetrapoda	NA	Ichthyostega	watsoni	Famennian	56*	Blom 2005

Tetrapoda	NA	Ichthyostega	eigili	Famennian	92*		Blom 2005
Tetrapoda	NA	Metaxygnathus	denticulus	Famennian	70*		Campbell & Bell 1977
Tetrapoda	NA	Densignathus	rowei	Famennian	100*		Ahlberg et al. 2005
Tetrapoda	NA	Ventastega	curonica	Famennian	110*		Ahlberg & Clack 2008
Tetrapoda	NA	Ymeria	denticulata	Famennian	70*		Clack et al. 2012
Tetrapoda	NA	Tulerpeton	curtum	Famennian	90*		Lebedev & Coates 1995
Tetrapoda	NA	Pederpes	finneyae	Tournaisian	65		Clack & Finney 2005
Tetrapoda	NA	Occidens	portlocki	Tournaisian	100*		Clack & Ahlberg 2004
Tetrapoda	NA	Crassigyrinus	sp.	Tournaisian	120*		Smithson et al. 2012
Tetrapoda	NA	Small tetrapod	indet.	Tournaisian	40*		Smithson et al. 2012
Tetrapoda	NA	Ribbo	sp.	Tournaisian	85*		Smithson et al. 2012
Tetrapoda	NA	Lethiscus	stocki	Visean		15*	Wellstead 1982
Tetrapoda	NA	Casineria	kiddi	Visean	10		Paton et al. 1999
Tetrapoda	NA	Ossinodus	pueri	Visean	150*		Warren 2007
Tetrapoda	NA	Palaeomolgophis	scoticus	Visean	15*		Brough & Brough 1967
Tetrapoda	NA	Whatcheeria	deltae	Visean	100		Lombard & Bolt 1995
Tetrapoda	NA	Crassigyrinus	scoticus	Visean-Serpukhovian	180		Panchen 1985
Tetrapoda	NA	Adelogyrinus	simnorhynchus	Visean		23*	Brough & Brough 1967
Tetrapoda	NA	Greererpeton	burkemorani	Visean-Serpukhovian	140		Godfrey 1989
Tetrapoda	NA	Balanerpeton	woodi	Visean	50		Clack 2002
Tetrapoda	NA	Eldeceeon	rolfei	Visean		35	Clack 2002
Tetrapoda	NA	Silvanerpeton	miripedes	Visean		40	Clack 2002
Tetrapoda	NA	Westlothiana	lizzae	Visean	20		Clack 2002
Tetrapoda	NA	Loxomma	sp.	Visean-Serpukhovian		27	Clack 2002
Tetrapoda	NA	Acherontiscus	caledoniae	Visean-Serpukhovian		16	Carroll 1969
Tetrapoda	NA	Antlerpeton	clarkii	Visean		21*	Thomson et al. 1998
Tetrapoda	NA	Eucritta	melanolimnetes	Visean		47*	Clack 1998
Tetrapoda	NA	Ophiderepeton	nanum	Visean		13*	Boyd 1982
Tetrapoda	NA	Dolichopareias	disjectus	Visean		26*	Brough & Brough 1967
Tetrapoda	NA	Deltaherpeton	hiemstrae	Visean-Serpukhovian		82*	Bolt & Lombard 2010
Tetrapoda	NA	Eoherpeton	watsoni	Visean-Serpukhovian	87*		Smithson 1985
Tetrapoda	NA	Doragnathus	woodi	Visean-Serpukhovian	70*		Smithson 1980
Tetrapoda	NA	Caerorhachis	bairdi	Serpukhovian	30		Holmes & Carroll 1977
Tetrapoda	NA	Colosteid	indet.	Serpukhovian	60		Garcia et al. 2006
Tetrapoda	NA	Adelospondylus	watsoni	Serpukhovian	20*		Carroll 1967
Tetrapoda	NA	Utaherpeton	franklini	Serpukhovian	5		Carroll et al. 1991
Tetrapoda	NA	Proterogyrinus	sp.	Serpukhovian	250		Clack 2002
Tetrapoda	NA	Adelogyrinus	sp.	Serpukhovian		50	Clack 2002

Tetrapoda	NA	Spathicephalus	mirus	Serpukhovian	100*	2

Table S2.
Descriptive statistics for raw body lengths (cm).

Stage	N	Min (cm)	Max (cm)	Mean	St. D.	Var.	Median	1st Quart.	3rd Quart.
Lochkovian	141	3.00	200.00	20.91	19.31	372.87	22.00	11.00	27.00
Pragian	104	4.00	200.00	31.32	32.86	1080.07	22.00	15.00	35.50
Emsian	117	2.00	270.00	45.24	47.26	2233.10	29.50	18.75	51.00
Eifelian	90	5.00	600.00	60.15	89.57	8023.22	31.50	19.25	59.50
Givetian	184	3.12	360.00	65.28	67.08	4275.70	33.00	21.75	70.00
Frasnian	234	3.00	700.00	76.83	83.80	7022.02	51.00	31.00	84.75
Famennian	138	4.00	800.00	110.25	135.86	18456.72	72.00	39.50	115.00
Tournaisian	72	5.00	340.00	97.70	89.83	8068.71	69.00	21.50	172.50
Visean	130	4.50	700.00	63.86	87.42	7641.94	29.50	13.00	82.75
Serpukhovian	116	3.00	700.00	57.37	99.80	9960.08	17.00	10.00	50.00

Table S3.

Descriptive statistics for Log-transformed body lengths. Means and variances used in *PaleoTS* model-fitting analyses. Other metrics mapped in box plots (Fig. 1A).

Stage	N	Min	Max	Mean	St. D.	Var.	Median	1st Quart.	3rd Quart.
Lochkovian	141	0.48	2.30	1.22	0.29	0.09	1.23	1.04	1.43
Pragian	104	0.60	2.30	1.36	0.33	0.11	1.34	1.18	1.55
Emsian	117	0.30	2.43	1.49	0.38	0.14	1.47	1.27	1.71
Eifelian	90	0.70	2.78	1.55	0.42	0.18	1.50	1.28	1.77
Givetian	184	0.49	2.56	1.63	0.40	0.16	1.60	1.34	1.90
Frasnian	234	0.48	2.85	1.72	0.38	0.14	1.71	1.49	1.93
Famennian	138	0.60	2.90	1.83	0.44	0.19	1.86	1.60	2.06
Tournaisian	72	0.70	2.53	1.74	0.53	0.28	1.84	1.33	2.24
Visean	130	0.65	2.85	1.53	0.48	0.23	1.47	1.11	1.11
Serpukhovian	116	0.48	2.85	1.40	0.52	0.27	1.23	1.00	1.70

Table S4.

OLS regressions: Devonian and Mississippian sizes and age. See Figure 1A, S2 and S3 for plots. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Devonian (N=1007)	**Mississippian (N=319)**
Slope a	0.012	-0.013
Intercept b	6.21	-2.92
err a	0.00074	0.0029
err b	0.29	0.98
r	0.45	-0.25
r^2	0.20	0.062
t	16.09	-4.56
p(uncorr)	***5.32E-52***	***7.30E-06***
permut p	***0.0001***	***0.0001***
95% CI on a	0.011/0.013	-0.019/-0.0073
95% CI on b	5.66/6.75	-4.94/-0.94
Durbin-Watson	1.30	0.87
p(homoscedastic)	0.00027	9.90E-01

Table S5.

RMA regression: Devonian and Mississippian sizes and age. See Figure S4, S5, and S6. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Devonian (N=1007)	**Mississippian (N=319)**
Slope a	0.026	-0.053
Intercept b	11.82	-16.40
err a	0.00074	0.0029
err b	0.083	0.95
r	0.45	-0.25
r^2	0.20	0.062
t	16.09	-4.56
p(uncorr)	***5.32E-52***	***7.30E-06***
permut p	***0.0001***	***0.0001***
95% CI on a	0.025/0.027	-0.057/-0.049
95% CI on b	11.3/12.34	-17.58/-15.10
Durbin-Watson	1.024	0.90
p(homoscedastic)	0.023	0.16

Table S6.

Mann-Whitney U-tests for pairwise stages. Values for each stage vs. previous stage. Body lengths (cm) transformed by Log_{10}.

Stage	T=Ub	p(same)	Monte Carlo p
Lockhovian			
Pragian	5549	***0.0011***	***0.0011***
Emsian	4769	***0.0056***	***0.0046***
Eifelian	4854	0.34	0.34
Givetian	7307	0.11	0.12
Frasnian	18500	***0.013***	***0.015***
Famennian	13070	***0.0022***	***0.0015***
Tournaisian	4738	0.58	0.59
Visean	3508	***0.004***	***0.0038***
Serpukhovian	6169	***0.018***	***0.018***

Table S7.

Oxygen estimates for stage midpoints. Values for taken from published graphs. Stage midpoints estimated from timescale in use at publication of original estimates. See Figure S4 for plot.

	GCSv % atmos. (Berner 2009)	COPSE pO2 (Bergmann 2004)	Charcoal % atmos. (Glasspool and Scott 2010)
Lock	25.37	0.23	
Prag	25.72	0.24	
Ems	23.1	0.26	14.84
Eif	20.29	0.29	15.25
Giv	18.7	0.31	16.02
Fra	17.75	0.37	18.54
Fam	19.21	0.54	22.59
Tour	22.49	0.69	27.16
Vis	23.12	1.13	27.83
Serp	22.08	1.24	27.06

Table S8.

OLS regressions: sizes and oxygen estimates. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	GCSv % atmos. (Berner 2009)	COPSE pO2 (Bergman et al. 2004)	Charcoal % atmos. (Glasspool and Scott 2010)
Slope a	-0.054	0.0075	-0.0024
Intercept b	2.71	1.56	1.67
err a	0.0042	0.036	0.0028
err b	0.090	0.022	0.059
r	-0.33	0.0057	-0.027
r^2	0.11	3.30E-05	0.00072
t	-12.83	0.21	-0.88
p(uncorr)	***1.41E-35***	0.83	0.38
permut p	***0.0001***	0.83	0.38
95% CI on a	-0.061/ -0.047	-0.066/ 0.080	-0.0083/ 0.0034
95% CI on b	2.55/ 2.87	1.51/ 1.60	1.55/ 1.79
Durbin-Watson	1.062	0.94	1.17
p(homosced.)	0.38	6.49E-08	1.99E-09

Table S9.

RMA regressions: sizes and oxygen estimates. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	GCSv % atmos. (Berner 2009)	COPSE pO2 (Bergman et al. 2004)	Charcoal % atmos. (Glasspool and Scott 2010)
Slope a	-0.16	1.31	-0.091
Intercept b	5.01	0.90	3.50
err a	0.0042	0.036	0.0028
err b	0.0082	0.00064	0.0036
r	-0.33	0.0057	-0.027
r^2	0.11	3.30E-05	0.00072
t	-12.82	0.21	-0.88
p(uncorr)	***1.41E-35***	0.83	0.40
permut p	***0.0001***	0.83	0.38
95% CI on a	-0.17/-0.15	1.25/3.97	-0.28/-0.087
95% CI on b	4.84/5.17	-0.47/0.92	3.41/7.29
Durbin-Watson	0.77	0.50	0.60
p(homosced.)	0.91	9.48E-109	7.57E-05

Table S10.

Temperature and proxy estimates for stage midpoints. Values taken from published graphs. Stage midpoints estimated from timescale in use at publication of original estimates. See Figs. S5 and S6 for plots.

Stage	dO18 Sea Surface (Royer et al. 2004)	Conodont Temp. (Grossman 2012)	COPSE Temp. (Bergman et al. 2004)	COPSE pCO2 (Bergmann et al. 2004)	Paleosol pCO2 (Breecker et al. 2010)	GCSv atmos. CO2 (Berner 2009)	Proxies atmos. CO2 (Royer 2014)
Lock	3.28	32.23	21.52	4019.59	1884.46	2888.26	1582.29
Prag	3.63	34.35	21.13	3778.65	1744.93	2735.89	1784.41
Ems	4.07	29.13	20.57	3455.34	1362.32	2570	2076.03
Eif	4.74	27.99	20.26	3202.74	840.58	1970.65	1813.28
Giv	5.32	28.48	20.28	3179.24	1437.68	1547.4	1654.48
Fra	5.92	35.33	20.3	3085.21	1686.96	1737.02	1377.29
Fam	4.37	31.58	18.56	2309.5	1095.65	1889.39	840.23
Tou	2.95	25.22	16.32	1539.67	921.74	589.16	681.42
Vis	1.17	22.45	15.53	1269.34	365.22	311.51	531.28
Serp	0.05	17.23	14.93	1081.29	376.81	375.85	317.61

Table S11.

OLS regression: sizes and temperature estimates. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}. dO_{18} Sea Surface Temperature had the largest effect size (r) and so was used in model-fitting.

	dO_{18} Sea Surface (Royer et al. 2004)	**Conodont Temp. (Grossman 2012)**	**COPSE Temp. (Bergman et al. 2004)**	**COPSE pCO2 (Bergman et al. 2004)**	**Paleosol pCO2 (Breecker et al. 2010)**	**GCSv atmos. CO2 (Berner 2009)**	**Proxies Atmos. CO2 (Royer, 2014)**
Slope a	0.050	0.068	-0.012	-5.49E-05	-3.76E-05	-6.73E-05	-6.87E-05
Intercept b	1.37	1.36	1.79	1.71	1.61	1.67	1.65
err a	0.0068	0.0023	0.0056	1.28E-05	2.40E-05	1.44E-05	2.24E-05
err b	0.029	0.069	0.11	0.038	0.032	0.027	0.031
r	0.20	0.080	-0.059	-0.12	-0.043	-0.13	-0.084
r^2	0.040	0.0064	0.0036	0.014	0.0019	0.016	0.0070
t	7.44	2.93	-2.16	-4.28	-1.57	-4.66	-3.062
p(uncorr)	**1.82E-13**	***0.0034***	***0.031***	***2.00E-05***	0.12	***3.46E-06***	***0.0022***
permut p	**0.0001**	***0.0025***	***0.029***	***0.0001***	0.11	***0.0001***	***0.0016***
95% CI on a	0.037/ 0.065	0.0022/ 0.011	-0.023/ -0.00066	-8.077E-05/ -2.82E-05	-8.57E-05/ -7.90E-06	-9.56E-05/ -3.90E-05	-0.00011/ -2.22E-05
95% CI on b	1.30/ 1.43	1.23/ 1.50	1.57/ 2.015	1.63/ 1.79	1.54/ 1.67	1.61/ 1.73	1.58/ 1.72
Durbin-Watson	1.14	0.95	0.95	0.96	0.95	0.96	0.95
p(homosced.)	7.67E-07	3.33E-05	5.47E-11	5.09E-07	1.38E-07	2.57E-11	2.82E-12

Table S12.

RMA regression: sizes and temperature estimates. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}. dO_{18} Sea Surface Temperature had the largest effect size (r) and so was used in model-fitting.

	dO_{18} Sea Surface (Royer et al. 2004)	**Conodont Temp. (Grossman 2012)**	**COPSE Temp. (Bergman et al. 2004)**	**COPSE pCO2 (Bergman et al. 2004)**	**Paleosol pCO2 (Breecker et al. 2010)**	**GCSv atmos. CO2 (Berner 2009)**	**Proxies Atmos. CO2 (Royer, 2014)**
Slope a	0.25	0.084	-0.20	-0.00047	-0.0087	-0.00053	-0.00082
Intercept b	0.60	-0.9	5.46	2.86	2.65	2.46	2.62
err a	0.0068	0.0023	0.0056	1.28E-05	2.40E-05	1.44E-05	2.24E-05
err b	0.00092	0.0048	0.012	0.0015	0.0012	0.00086	0.0011
r	0.20	0.080	-0.059	-0.12	-0.043	-0.13	-0.084
r^2	0.040	0.0064	0.0036	0.014	0.0019	0.016	0.0070
t	7.44	2.93	-2.16	-4.28	-1.57	-4.66	-3.062
p(uncorr)	**1.82E-13**	***0.0034***	***0.031***	***2.00E-05***	0.12	***3.46E-06***	***0.0022***
permut p	**0.0001**	***0.0041***	***0.034***	***0.0001***	0.11	***0.0001***	***0.003***
95% CI on a	0.24/ 0.26	0.080/ 0.088	-0.60/ -0.19	-0.00049/ -0.00045	-0.0026/ -0.00084	-0.00055/ -0.00051	-0.00085/ -0.00078
95% CI on b	0.54/ 0.66	-1.023/ -0.77	5.27/ 13.09	2.79/ 2.93	2.58/ 4.82	2.40/ 2.51	2.56/ 2.68
Durbin-Watson	0.69	0.61	0.52	0.56	0.61	0.56	0.57
p(homosced.)	8.24E-34	4.20E-24	4.83E-84	7.80E-70	4.11E-54	7.72E-52	1.65E-34

Table S13.

Model comparison for body lengths time series. Body lengths (cm) transformed by Log_{10}. The "directional with shift" model identified the shift at Step 7, marking the Famennian/End-Devonian as the end of one trend and start of another.

Model	**Log Likelihood**	**K**	**AICc**	**Akaike Weight**
Directional with Shift (GRW/shift)	***13.71***	***4***	***-16.63***	***0.932***
Directional (GRW)	6.02	2	-6.056	0.005
Random walk (URW)	5.96	1	-9.35	0.025
Stasis	4.28	2	-2.57	0.001
Temperature (dO_{18})	7.86	2	-9.72	0.029
Oxygen (% atmos.)	6.57	2	-7.14	0.008

Table S14.

Species per size class in Devonian-Mississippian faunas.

	1-19 cm	20-39 cm	40-59 cm	60-79 cm	80-99 cm	100-199 cm	200-299 cm	300-399 cm	400+ cm	Total
Xishancun	10	6	0	0	0	0	0	0	0	16
Cwm Mill	5	1	0	0	0	0	0	0	0	6
Wayne Herbert Quarry	6	6	0	0	0	0	0	0	0	12
Canadian Arctic	3	6	1	0	0	0	0	0	0	10
MOTH	8	2	0	0	0	0	0	0	0	10
Cuifengshan	15	6	0	0	0	0	0	0	0	21
Besom Farm	0	5	2	1	0	0	0	0	0	8
Dniester	2	8	1	0	0	0	0	0	0	11
Khmeleva	4	2	0	0	0	0	0	0	0	6
Cottonwood Canyon	0	6	1	0	0	0	0	0	0	7
Strypa	5	6	0	0	0	0	0	0	0	11
Wood Bay	4	3	1	0	0	0	0	0	0	8
Xujiachong	9	5	1	0	1	0	0	0	0	16
Hunsruck	1	1	1	3	1	2	1	0	0	10
Kureyka	0	5	2	0	0	0	0	0	0	7
Cavan Bluff	4	3	0	0	0	2	0	0	0	9
Wee Jasper	2	1	0	1	1	1	2	0	0	8
Water Canyon	3	8	4	0	0	0	0	0	0	15
Beartooth Butte	1	6	2	1	0	0	0	0	0	10
Wuding	3	3	0	2	0	1	0	0	0	9
Parnu	2	2	1	0	2	0	0	0	0	7
Tiaomaijan	1	5	2	0	0	1	0	0	0	9
Vstrechnaya	1	1	4	3	1	1	1	0	1	13
Narva	1	1	1	0	1	1	1	0	1	7
Achanarras	6	6	2	1	0	1	0	0	0	16
Cruaday	2	6	1	1	0	1	0	0	0	11
Tynet Burn	4	4	2	2	0	0	0	0	0	12
Qujing	3	1	1	1	0	0	0	0	0	6
Orcadian Lake	7	6	1	2	0	1	0	0	0	17
Gerolstein	3	2	0	1	1	0	1	0	0	8
Rockport	1	0	1	1	2	1	0	1	0	7
Aztec	2	7	10	4	2	3	0	0	1	29
Haikou	1	0	2	1	0	4	0	0	0	8
Mt. Howitt	1	2	3	1	0	0	0	0	0	7
Abava	1	0	0	0	1	2	1	0	0	5

Cedar Valley	0	2	1	0	2	4	2	0	0	11
Gauja	3	3	1	2	2	3	1	0	0	15
Gladbach	5	3	1	0	0	2	0	0	0	11
Gogo	5	16	9	7	4	1	1	0	0	43
Kerman	0	0	1	1	0	3	0	0	1	6
North Evans	0	0	2	0	0	2	4	2	0	10
Miguasha	8	2	3	2	1	1	0	0	0	17
Wietrznia	0	1	2	2	1	4	0	0	0	10
Rodebjergi	0	1	2	0	1	1	0	0	0	5
Rhinestreet	0	2	2	0	2	2	0	1	0	9
Chemung	0	0	0	1	2	2	1	0	0	6
Wildungen	0	18	7	7	2	1	0	0	2	37
Stolbovo	0	0	0	1	2	1	0	0	1	5
Oryol	1	1	0	1	2	2	0	0	0	7
Portishead	0	1	0	1	2	2	0	0	0	6
Aina Dal	0	2	0	1	0	3	0	0	0	6
Britta Dal	0	1	2	1	1	2	0	0	0	7
Hyner	1	1	1	0	1	3	1	0	0	8
Evieux	1	1	0	1	0	2	0	0	0	5
Ketleri	1	1	0	1	0	2	0	0	0	5
Cleveland Shale	2	1	2	4	3	8	1	1	7	29
Witpoort	2	1	1	0	1	1	0	0	0	6
Izkchul Village	6	0	0	1	0	0	0	0	0	7
Foulden	5	3	0	0	0	0	0	0	0	8
Mansfield	1	2	2	0	1	0	1	0	0	7
Waaipoort	7	2	1	0	0	0	0	0	0	10
Glencartholm	21	2	1	0	1	1	0	0	0	26
Burdiehouse	3	4	1	0	0	1	1	0	1	11
Wardie	8	4	1	0	0	0	1	0	1	15
Cheese Bay	6	2	1	0	0	0	0	0	1	10
East Kirkton	1	2	4	0	0	0	0	0	0	7
Gilmerton	1	1	0	1	1	2	0	0	1	7
Ardross Castle	5	2	1	0	0	0	0	0	0	8
Abden	1	1	3	0	0	0	0	0	0	5
Inchkeith	3	0	1	1	0	0	0	0	0	5
Bearsden	7	2	2	1	0	0	0	0	0	12
Loanhead	7	2	3	2	2	3	0	2	1	22
Niddrie	0	0	0	1	1	1	0	1	1	5
Millstone Grit	5	3	0	0	2	0	2	1	1	14
Bear Gulch	35	9	2	4	1	1	1	0	0	53
Cowdenbeath	0	0	1	1	1	2	1	0	0	6

Table S15.

Pairwise ANOSIM p-values (Bray-Curtis distances). Based on 1 million replicates.

	LO	PR	EM	EI	GI	FR	FA	TO	SE
LO		0.5756	**0.07935**	**0.01325**	**0.000885**	**0.000378**	**4.10E-05**	0.1395	**0.002289**
PR	0.5756		0.6234	0.3259	**0.02964**	**0.006007**	**0.000431**	0.4503	**0.03212**
EM	**0.07935**	0.6234		0.7173	0.4323	0.1026	**0.003856**	0.3575	0.203
EI	**0.01325**	0.3259	0.7173		0.4499	**0.05361**	**0.000382**	0.2118	**0.02424**
GI	**0.000885**	**0.02964**	0.4323	0.4499		0.5669	**0.04626**	0.1682	0.2817
FR	**0.000378**	**0.006007**	0.1026	**0.05361**	0.5669		0.1558	**0.02464**	0.4439
FA	**4.10E-05**	**0.000431**	**0.003856**	**0.000382**	**0.04626**	0.1558		**0.008997**	0.003401
TO	0.1395	0.4503	0.3575	0.2118	0.1682	**0.02464**	**0.008997**		
VI	**0.05401**	0.2668	0.3671	0.5682	**0.01337**	**0.00126**	**0.000292**	0.6399	**0.06268**
SE	**0.002289**	**0.03212**	0.203	**0.02424**	0.2817	0.4439	**0.003401**	0.608	

Table S16.

SIMPER results for adjacent stages

SIMPER LOCKHOVIAN VS. PRAGIAN: 44.01 (DISSIMILARITY INDEX)

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2
1-19 cm	21.92	49.81	49.81	6.13	3.29
20-39 cm	12.19	27.71	77.52	5	4
40-59 cm	4.046	9.194	86.71	0.5	0.857
60-79 cm	2.592	5.89	92.6	0.125	0.429
100-199 cm	1.364	3.099	95.7	0	0.286
80-99 cm	1.209	2.747	98.45	0	0.286
200-299 cm	0.6819	1.549	100	0	0.143
400+ cm	0	0	100	0	0
300-399	0	0	100	0	0

PRAGIAN VS. EMSIAN: 47.93

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2
20-39 cm	13.15	27.44	27.44	4	4.2
1-19 cm	13.08	27.28	54.72	3.29	2.6
40-59 cm	6.799	14.18	68.9	0.857	1.2
60-79 cm	5.446	11.36	80.26	0.429	0.8
100-199 cm	4.775	9.961	90.23	0.286	0.8
200-299 cm	2.783	5.805	96.03	0.143	0.4
80-99 cm	1.903	3.969	100	0.286	0.2
400+ cm	0	0	100	0	0
300-399	0	0	100	0	0

EMSIAN VS. EIFELIAN: 44.61

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2
20-39 cm	13.49	30.24	30.24	4.2	3.25
40-59 cm	8.09	18.14	48.38	1.2	1.75
1-19 cm	7.51	16.84	65.22	2.6	2.5
60-79 cm	4.728	10.6	75.81	0.8	1
100-199 cm	3.516	7.883	83.7	0.8	0.625
80-99 cm	2.998	6.721	90.42	0.2	0.5
200-299 cm	2.99	6.704	97.12	0.4	0.25
400+ cm	1.284	2.879	100	0	0.25
300-399	0	0	100	0	0

EIFELIAN VS. GIVETIAN: 52.23

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2

20-39 cm	12.82	24.55	24.55	3.25	2.44
1-19 cm	8.778	16.81	41.35	2.5	2.11
100-199 cm	8.059	15.43	56.78	0.625	2
40-59 cm	7.573	14.5	71.28	1.75	2.11
60-79 cm	5.087	9.739	81.02	1	1.33
80-99 cm	4.828	9.244	90.26	0.5	1.11
200-299 cm	3	5.743	96.01	0.25	0.556
400+ cm	1.414	2.707	98.71	0.25	0.111
300-399	0.6721	1.287	100	0	0.111

GIVETIAN VS. FRASNIAN: 59.17

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2
20-39 cm	13.2	22.31	22.31	2.44	3.91
1-19 cm	11.32	19.13	41.44	2.11	1.64
40-59 cm	9.085	15.36	56.8	2.11	2.64
100-199 cm	7.108	12.01	68.81	2	1.82
60-79 cm	6.073	10.26	79.07	1.33	1.91
80-99 cm	4.783	8.084	87.16	1.11	1.36
200-299 cm	4.132	6.983	94.14	0.556	0.545
300-399	1.778	3.005	97.15	0.111	0.273
400+ cm	1.689	2.854	100	0.111	0.364

FRASNIAN VS. FAMMENIAN; 56.34

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2
20-39 cm	10.96	19.45	19.45	3.91	1.11
1-19 cm	9.281	16.47	35.92	1.64	0.889
40-59 cm	8.812	15.64	51.56	2.64	0.667
100-199 cm	6.369	11.31	62.87	1.82	2.78
60-79 cm	6.298	11.18	74.05	1.91	1.11
80-99 cm	5.854	10.39	84.44	1.36	1.11
400+ cm	3.576	6.348	90.78	0.364	0.778
200-299 cm	3.416	6.063	96.85	0.545	0.222
300-399	1.776	3.152	100	0.273	0.111

FAMENNIAN VS. TOURNAISIAN: 69.66

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2
1-19 cm	22.59	32.43	32.43	0.889	4
100-199 cm	16.34	23.46	55.89	2.78	0
20-39 cm	8.815	12.65	68.55	1.11	1.67
80-99 cm	5.927	8.51	77.06	1.11	0.333
40-59 cm	5.892	8.458	85.51	0.667	0.667
60-79 cm	4.961	7.123	92.64	1.11	0.333
200-299 cm	2.682	3.851	96.49	0.222	0.333

400+ cm	2.141	3.074	99.56	0.778	0
300-399	0.3059	0.4391	100	0.111	0

TOURNAISIAN VS. VISEAN: 49.6

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2
1-19 cm	20.67	41.68	41.68	4	5.6
40-59 cm	8.587	17.31	58.99	0.667	1.4
20-39 cm	8.46	17.06	76.04	1.67	2
60-79 cm	2.562	5.166	81.21	0.333	0.2
200-299 cm	2.404	4.847	86.06	0.333	0.2
80-99 cm	2.404	4.847	90.9	0.333	0.2
400+ cm	2.27	4.575	95.48	0	0.4
100-199 cm	2.243	4.521	100	0	0.4
300-399	0	0	100	0	0

VISEAN VS. SERPUKHOVIAN: 61.94

Taxon	Av. dissim	Contrib. %	Cumulative %	Mean abund. 1	Mean abund. 2
1-19 cm	25.66	41.43	41.43	5.6	9
20-39 cm	8.155	13.17	54.6	2	2.67
40-59 cm	5.892	9.513	64.11	1.4	1.33
100-199 cm	5.033	8.125	72.23	0.4	1.17
80-99 cm	4.567	7.372	79.61	0.2	1.17
60-79 cm	4.44	7.169	86.77	0.2	1.5
300-399	2.974	4.802	91.58	0	0.667
200-299 cm	2.876	4.642	96.22	0.2	0.667
400+ cm	2.342	3.782	100	0.4	0.5

Table S17.

NMDS scores for faunas (Bray-Curtis distances). Scores based on actual species counts within size classes. See Fig. 2 for bins and Fig. S11 for plot with site labels. Positive values on coordinate 1 are associated with larger size classes, while positive values on coordinate 2 were associated with marine localities.

Name	Coordinate 1	Coordinate 2
Xishancun	-0.13401	-0.013816
CwmMill	-0.083392	-0.093586
MOTH	-0.10853	-0.068182
WayneHerbertQuarry	-0.11426	-0.011808
CanadianArctic	-0.085673	0.017303
Cuifengshan	-0.15994	-0.012009
BesomFarm	-0.044874	0.082915
Dniester	-0.094358	0.04847
Khmeleva	-0.076849	-0.068996
CottonwoodCanyon	-0.10139	0.085455
Strypa	-0.11027	-0.0081705
WoodBay	-0.070683	-0.023517
Xujiachong	-0.099404	-0.0095991
Hunsruck	0.079494	-0.0050898
Kureyka	-0.070452	0.090676
CavanBluff	-0.037325	-0.047101
WeeJasper	0.056662	-0.06292
WaterCanyon	-0.087255	0.052567
BeartoothButte	-0.047713	0.05855
Wuding	-0.022731	-0.039727
Parnu	0.00056634	-0.023888
Tiaomaijan	-0.028912	0.052565
Vstrechnaya	0.061833	0.054546
Narva	0.070133	-0.016985
Achanarras	-0.061435	0.0077254
Cruaday	-0.035423	0.023681
TynetBurn	-0.056288	0.0072966
Qujing	-0.014589	-0.059493
OrcadianLake	-0.073725	0.0005295
Gerolstein	-0.0049861	-0.060064
Rockport	0.11244	-0.045717
Aztec	-0.0048322	0.10969
Haikou	0.11576	0.042735
MtHowitt	0.0053003	0.050534
Abava	0.13287	-0.078127
CedarValley	0.10312	0.036683
Gauja	0.020518	-0.0098037
Gladbach	-0.039258	-0.025969
Gogo	-0.074547	0.13633
Kerman	0.1688	0.013633
NorthEvans	0.17388	0.11399
Miguasha	-0.029436	-0.016227
Wietrznia	0.10568	0.041446
Rodebjergi	0.085453	0.063042
Rhinestreet	0.076676	0.042699

Chemung	0.16831	-0.037918
Wildungen	-0.026642	0.18204
Stolbovo	0.18426	-0.062142
Oryol	0.096716	-0.038702
Portishead	0.13664	-0.034202
AinaDal	0.11477	0.0011165
BrittaDal	0.096416	0.018351
Hyner	0.084435	-0.0009897
Evieux	0.086954	-0.057573
Ketleri	0.086796	-0.057514
ClevelandShale	0.093189	0.11828
Witpoort	0.034236	-0.033983
Mansfield	0.020348	0.039858
Foulden	-0.092882	-0.049242
Izkchul	-0.086201	-0.11627
Waaipoort	-0.086985	-0.045435
Glencartholm	-0.15124	-0.067141
Burdiehouse	-0.035098	0.00047472
Wardie	-0.095921	-0.021231
CheeseBay	-0.078886	-0.046934
EastKirkton	-0.013405	0.083134
Gilmerton	0.095244	-0.039737
Abden	0.017612	0.095065
Inchkeith	-0.016783	-0.10785
ArdrossCastle	-0.071549	-0.041947
Bearsden	-0.064529	-0.028782
Loanhead	0.0044847	-0.00511
Niddrie	0.19072	-0.068371
MillstoneGrit	-0.051642	-0.071964
BearGulch	-0.1809	0.073297
Cowdenbeath	0.14488	-0.010856

Table S18.

NMDS scores for faunas (Kulczynski distances). Scores based on presence-absence of each size class. See Fig. S14 for plot with site labels.

Name	Axis 1	Axis 2
Xishancun	-0.1226	-0.02018
CwmMill	-0.12212	-0.020014
MOTH	-0.12237	-0.020097
WayneHerbertQuarry	-0.12181	-0.019839
CanadianArctic	-0.089901	0.025169
Cuifengshan	-0.12329	-0.020545
BesomFarm	-0.035556	-0.11722
Dniester	-0.090164	0.025245
Khmeleva	-0.12312	-0.020437
CottonwoodCanyon	-0.082074	0.10377
Strypa	-0.12168	-0.019849
WoodBay	-0.090234	0.025355
Xujiachong	-0.050686	0.056372
Hunsruck	0.033898	0.0039239
Kureyka	-0.081909	0.10307
CavanBluff	-0.078478	-0.082769
WeeJasper	0.068255	-0.035528
WaterCanyon	-0.090005	0.025281
BeartoothButte	-0.056105	-0.041361
Wuding	0.004864	-0.087033
Parnu	-0.050779	0.056429
Tiaomaijan	-0.044317	0.013779
Vstrechnaya	0.040517	0.010886
Narva	0.022518	0.068491
Achanarras	-0.012376	-0.037861
Cruaday	-0.012536	-0.037776
TynetBurn	-0.056192	-0.041463
Qujing	-0.055693	-0.041528
OrcadianLake	-0.012175	-0.037965
Gerolstein	0.050867	-0.077614
Rockport	0.12141	-0.020329
Aztec	0.031512	-0.010271
Haikou	0.036156	-0.11186
MtHowitt	-0.055571	-0.041571
Abava	0.14325	0.10062
CedarValley	0.07133	0.094408
Gauja	0.034246	0.0039685
Gladbach	-0.044383	0.013631
Gogo	0.032222	0.0040946
Kerman	0.16607	-0.1025
NorthEvans	0.14809	0.18342
Miguasha	0.023205	-0.013294
Wietrznia	0.087015	0.0073068
Rodebjergi	0.067749	0.080208
Rhinestreet	0.079737	0.11211
Chemung	0.19272	0.030769
Wildungen	0.10444	0.0093181

Stolbovo	0.20392	-0.040336
Oryol	0.047844	-0.050833
Portishead	0.12373	-0.045452
AinaDal	0.094843	-0.11098
BrittaDal	0.087157	0.0073483
Hyner	0.019335	0.060311
Evieux	0.0047295	-0.086832
Ketleri	0.004954	-0.087226
ClevelandShale	0.051335	0.020554
Witpoort	0.0021087	0.038518
Mansfield	-0.026544	0.084663
Foulden	-0.12286	-0.020317
Izkchul	0.0032877	-0.17811
Waaipoort	-0.089776	0.024997
Glencartholm	0.0018686	0.038595
Burdiehouse	-0.00856	0.090023
Wardie	-0.071405	0.10781
CheeseBay	-0.10793	0.056918
EastKirkton	-0.089626	0.024948
Gilmerton	0.071182	-0.052474
Abden	-0.089596	0.024806
Inchkeith	-0.031916	-0.14225
ArdrossCastle	-0.089464	0.024858
Bearsden	-0.055863	-0.041507
Loanhead	0.045865	-0.00581
Niddrie	0.2244	-0.033266
MillstoneGrit	-0.00179	0.1686
BearGulch	0.032604	0.0039937
Cowdenbeath	0.15221	0.039727

Table S19.

OLS regressions: Devonian vertebrate division sizes and age.

	Agnatha	Placo.	Actinopt.	Sarcopt.	Tetra.	Acanth.	Chond.	Aca.+Ch.
N	219	429	28	158	15	115	41	156
Slope a	0.012	0.012	0.011	0.0085	-0.0086	0.029	0.012	0.0095
Intercept b	6.39	6.46	5.26	4.90	-1.19	2.48	6.23	5.20
err a	0.0018	0.0014	0.0039	0.0020	0.0051	0.0028	0.0043	0.0022
err b	0.73	0.53	1.51	0.78	1.91	2.48	1.62	0.85
r	0.42	0.40	0.47	0.32	-0.42	0.097	0.40	0.33
r^2	0.18	0.16	0.22	0.10	0.18	0.0094	0.16	0.11
t	6.91	8.96	2.68	4.17	-1.67	1.040	2.71	4.39
p(uncorr)	***5.20E-11***	***9.81E-18***	***0.013***	***5.12E-02***	0.12	0.30	***0.0099***	***2.06E-05***
permut p	***0.0001***	***0.0001***	***0.013***	***0.0001***	0.12	0.29	***0.010***	***0.0001***
95% CI on a	0.0077/ 0.017	0.0098 /0.015	0.0029/ 0.019	0.0051/ 0.012	-0.015/ -0.0077	-0.0028/ 0.0027	0.0062/ 0.017	0.0054/ 0.014
95% CI on b	4.50/ 8.37	4.45/ 7.52	2.25/ 8.63	3.59/ 6.34	-3.91/ 4.80	0.28/ 4.66	4.13/ 8.26	3.59/ 6.94
Durbin-Watson	1.26	1.42	2.034	1.56	2.32	1.38	1.44	1.23
p(homosced.)	5.98E-07	0.95	0.017	0.40	0.56	0.71	0.25	0.51

Table S20.

RMA regressions: Devonian vertebrate division sizes and age.

	Agnatha	**Placo.**	**Actinopt.**	**Sarcopt.**	**Tetra.**	**Acanth.**	**Chond.**	**Aca.+Ch.**
N	219	429	28	158	15	115	41	156
Slope a	0.029	0.031	0.023	0.027	-0.020	0.029	0.029	0.029
Intercept b	13.21	13.68	9.90	11.94	-5.58	12.95	12.87	12.77
err a	0.0018	0.0014	0.0039	0.0020	0.0051	0.0027	0.0043	0.0022
err b	0.53	0.28	2.27	0.61	3.63	1.17	2.63	0.75
r	0.42	0.40	0.47	0.32	-0.42	0.097	0.40	0.33
r^2	0.18	0.16	0.22	0.10	0.18	0.094	0.16	0.11
t	6.91	8.96	2.79	4.17	-1.67	1.040	2.71	4.27
p(uncorr)	***5.20E-11***	***9.81E-18***	***0.013***	***5.12E-02***	0.12	0.30	***0.01***	***3.43E-05***
permut p	***0.0001***	***0.0001***	***0.013***	***0.0001***	0.12	0.30	***0.009***	***0.0002***
95% CI on a	0.025/ 0.033	0.030/ 0.034	0.015/ 0.030	0.022/ 0.030	-0.030/ -0.0052	0.025/ 0.090	0.018/ 0.037	0.026/ 0.032
95% CI on b	11.61/ 14.56	12.57/ 14.67	6.97/ 12.71	10.17/ 13.37	-9.16/ -12.15	11.25/ 37.03	8.86/ 15.62	11.47/ 13.96
Durbin-Watson	0.95	1.058	1.53	1.096	1.57	0.83	1.20	1.00
p(homosced.)	3.29E-08	0.0062	0.06	0.10	0.014	0.093	0.77	0.69

Table S21.

Mann-Whitney U-Test results for vertebrate divisions. Body lengths (cm) transformed by Log_{10}. Monte Carlo p-values for each stage versus previous stage. Only comparisons of bins with more than four values included.

Stage	Acanth.	Actinopt.	Agnatha	Chond.	Placo.	Sarc.	Tetra.	Aca+Ch.
Lockhovian								
Pragian	**0.0003**		0.99		**0.031**	0.26		**0.0001**
Emsian	0.23		**0.045**		*0.062*	0.84		0.25
Eifelian	0.98		**0.071**		0.82	0.16		0.95
Givetian	0.56		0.14		0.71	**0.015**		0.41
Frasnian	0.98	0.76	0.24		*0.065*	0.38	0.47	*0.087*
Famennian	0.62	0.67		0.85	**0.0008**	0.38	**0.055**	0.35
Tournaisian	**0.024**	0.21		**0.082**		0.83	0.72	**0.006**
Visean	0.71	0.15		**0.031**		0.47	0.12	**0.039**
Serpukhovian	0.91	**0.005**		**0.0001**		0.94	0.22	**0.0007**

Table S22.

Multivariate model comparisons for Devonian divisions. Body lengths in cm transformed by Log_{10} to correct for allometry. Models fit to transformed body length means and variances using the joint method (n=42). Temperature proxy is sea surface dO_{18} (from Royer et al. 2004). Oxygen proxy is estimated atmospheric percentage from the GEOCARBSULFvolc model (Berner, 2009 in Royer, 2014).

Model	Log Likelihood	K	AICc	Akaike Weights
Directional (GRW)	***22.89***	***9***	***-22.15***	***0.94***
Random walk (URW)	18.44	8	-16.53	0.06
Stasis	8.84	8	2.68	0
Temperature (dO_{18})	-2.023	3	10.68	0
Oxygen (% atmos.)	0.032	3	6.57	0

Table S23.

OLS regressions: Devonian “Agnathan” clades size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Heterostraci	**Osteostraci**
N	110	70
Slope a	0.019	0.0079
Intercept b	9.054	4.49
err a	0.0022	0.0031
err b	0.87	1.27
r	0.64	0.29
r^2	0.41	0.086
t	8.68	2.53
p(uncorr)	***4.48E-14***	***0.014***
permut p	***0.0001***	***0.014***
95% CI on a	0.015/ 0.023	0.00029/ 0.016
95% CI on b	7.36/ 10.66	1.36/ 7.85
Durbin-Watson	1.61	1.61
p(homosced.)	0.15	0.019

Table S24.

RMA regressions: Devonian "Agnathan" clade size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Heterostraci	**Osteostraci**
N	110	70
Slope a	0.029	0.027
Intercept b	13.30	12.21
err a	0.0022	0.0031
err b	0.76	1.61
r	0.64	0.29
r^2	0.41	0.086
t	8.68	2.53
p(uncorr)	***4.48E-14***	***0.014***
permut p	***0.0001***	***0.014***
95% CI on a	0.024/ 0.033	0.021/ 0.078
95% CI on b	11.19/ 14.92	9.82/ 32.98
Durbin-Watson	1.29	1.064
p(homosced.)	0.047	0.0092

Table S25.

OLS regressions: Devonian "Placoderm" clades size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Arthrodira	**Antiarchi**	***Bothriolepis***	**Ptyctodontida**	**Phyllolepida**	**Petalichthyida**
N	231	133	49	31	12	13
Slope a	0.011	0.014	0.013	0.0011	0.0015	0.010
Intercept b	5.91	6.80	6.64	2.13	1.97	5.45
err a	0.0017	0.0018	0.0046	0.015	0.014	0.0057
err b	0.66	0.71	1.74	5.64	5.41	2.25
r	0.38	0.55	0.39	0.014	0.031	0.48
r^2	0.14	0.30	0.15	0.00019	0.00098	0.23
t	6.12	7.52	2.88	0.074	0.11	1.80
p(uncorr)	***3.98E-09***	***7.65E-12***	***0.0060***	0.94	0.92	0.10
permut p	***0.0001***	***0.0001***	***0.0066***	0.94	0.91	0.098
95% CI on a	0.0075/ 0.014	0.010/ 0.017	0.0047/ 0.021	-0.029/ 0.033	-0.015/ 0.064	0.0028/ 0.023
95% CI on b	4.71/ 7.29	5.42/ 8.14	3.43/ 9.74	-9.37/ 14.34	-4.27/ 25.94	2.45/ 10.51
Durbin-Watson	1.73	1.74	2.21	1.65	2.24	2.11
p(homosced.)	0.39	0.46	0.74	0.83	0.81	0.40

Table S26.

RMA regressions: Devonian “Placoderm” clades size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Arthrodira	**Antiarcha**	***Bothriolepis***	**Ptyctodontida**	**Phyllolepida**	**Petalichthyida**
N	231	133	49	31	12	13
Slope a	0.028	0.025	0.034	-0.076	0.049	0.022
Intercept b	12.68	11.16	14.58	-27.36	19.94	9.90
err a	0.0017	0.0018	0.0046	0.014	0.015	0.0057
err b	0.44	0.50	3.039	29.21	34.27	5.072
r	0.38	0.55	0.39	-0.011	0.092	0.48
r^2	0.14	0.30	0.15	0.00012	0.0084	0.23
t	6.12	7.52	2.88	-0.060	0.29	1.80
p(uncorr)	***3.98E-09***	***7.65E-12***	***0.0060***	0.95	0.77	0.10
permut p	***0.0001***	***0.0001***	***0.0058***	0.95	0.76	0.098
95% CI on a	0.025/ 0.031	0.021/ 0.028	0.023/ 0.043	-0.251/ -0.052	0.039/ 0.22	0.011/ 0.072
95% CI on b	11.45/ 13.77	9.62/ 12.45	10.45/ 17.80	-93.90/ -18.07	16.08/ 85.64	5.81/ 29.71
Durbin-Watson	1.18	1.34	1.55	0.89	1.03	1.32
p(homosced.)	0.069	0.48	0.19	0.84	0.67	0.40

Table S27.

OLS regressions: Devonian "Acanthodian" clade size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Climatiida	**Gyracanthida**	**Ischnacanthida**	**Acanthodida**
N	40	22	39	17
Slope a	0.0084	-0.0027	-0.0037	0.0045
Intercept b	4.54	0.90	0.16	2.71
err a	0.0029	0.0060	0.0052	0.011
err b	1.15	2.27	2.068	4.19
r	0.43	-0.18	-0.12	0.11
r^2	0.18	0.032	0.013	0.013
t	2.90	-0.45	-0.70	0.41
p(uncorr)	***0.0061***	0.67	0.49	0.69
permut p	***0.005***	0.66	0.49	0.69
95% CI on a	0.0022/ 0.014	-0.014/ 0.014	-0.15/ 0.0077	-0.015/ 0.036
95% CI on b	2.088/ 6.87	-3.19/ 7.22	-4.32/ 4.67	-4.65/ 14.78
Durbin-Watson	1.53	1.75	1.55	1.70
p(homosced.)	0.56	0.11	0.97	0.30

Table S28.

RMA regressions: Devonian "Acanthodian" clade size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Climatiida	**Gyracanthida**	**Ischnacanthida**	**Acanthodida**
N	40	22	39	17
Slope a	0.020	-0.044	-0.032	0.028
Intercept b	9.04	-12.88	-11.041	11.71
err a	0.0029	0.0096	0.0052	0.0069
err b	1.33	10.77	4.28	7.086
r	0.42626	-0.20	-0.12	0.29
r^2	0.18169	0.041	0.013	0.085
t	2.9047	-0.93	-0.70	1.18
p(uncorr)	***0.0061***	0.37	0.49	0.26
permut p	***0.0071***	0.37	0.48	0.26
95% CI on a	0.015/ 0.024	-0.13/ -0.03	-0.11/ -0.024	0.012/ 0.096
95% CI on b	7.18/ 10.93	-42.14/ -8.037	-38.91/ -7.76	5.67/ 37.94
Durbin-Watson	1.12	1.62	0.96	1.14
p(homosced.)	0.082	0.93	0.74	0.52

Table S29.

OLS regression: Devonian Sarcopterygii clades size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Porolepiformes	**Dipnoi**	**Osteolepiformes**	**Rhizodontida**	**Actinistia**
N	22	63	41	5	10
Slope a	0.0044	0.0055	0.025	0.012	-0.00045
Intercept b	3.42	3.67	11.32	6.64	1.41
err a	0.0056	0.0025	0.0063	0.018	0.016
err b	2.16	0.98	2.37	6.88	6.051
r	0.17	0.27	0.54	0.35	-0.0099
r^2	0.029	0.071	0.30	0.12	9.89E-05
t	0.78	2.16	4.075	0.64	-0.028
p(uncorr)	0.45	***0.035***	***0.00021***	0.57	0.98
permut p	0.42	***0.036***	***0.0003***	0.65	0.98
95% CI on a	-0.0031/ 0.014	-0.00013/ 0.011	0.013/ 0.038	-0.017/ 0.079	-0.020/ 0.11
95% CI on b	0.46/ 7.063	1.53/ 5.75	6.49/ 16.01	-3.93/ 32.12	-6.27/ 43.47
Durbin-Watson	2.21	1.68	2.036	0.94	0.75
p(homosced.)	0.39	0.42	0.13	0.24	0.65

Table S30.

RMA regressions: Devonian Sarcopterygii clades size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Porolepiformes	**Dipnoi**	**Osteolepiformes**	**Rhizodontida**	**Actinistia**
N	22	63	41	5	10
Slope a	0.025	0.021	0.039	0.33635	-0.045
Intercept b	11.54	9.47	16.23	14.926	-15.53
err a	0.0056	0.0025	0.0057	0.018	0.016
err b	4.67	0.95	4.54	47.36	36.65
r	0.17153	0.23	0.41	0.35	-0.0099
r^2	0.029423	0.071	0.17	0.12	9.89E-05
t	0.77865	2.16	2.78	0.64	-0.028
p(uncorr)	0.4453	***0.035***	***0.0084***	0.57	0.98
permut p	0.4277	0.19	***0.0083***	0.65	0.98
95% CI on a	0.0079/ 0.093	0.016/ 0.027	0.028/ 0.048	0.019/ 0.14	-0.15/ 0.019
95% CI on b	5.00/ 37.82	7.64/ 11.93	12.35/ 19.66	9.82/ 55.662	-54.82/ 8.592
Durbin-Watson	1.07	1.040	1.28	1.35	1.15
p(homosced.)	0.70	0.003	0.32	0.33	0.032

Table S31.

Multivariate model comparison for Devonian clades. Body lengths in cm transformed by Log_{10} to correct for allometry. Models fit to transformed body length means and variances using the joint method (n=82). Temperature proxy is sea surface dO_{18} (from Royer et al. 2004). Oxygen proxy is estimated atmospheric percentage from the GEOCARBSULFvolc model (Berner, 2009 in Royer, 2014).

Model	Log Likelihood	K	AICc	Akaike Weights
Directional (GRW)	***28.12***	***17***	***-12.67***	***0.99***
Random walk (URW)	21.36	16	-2.35	0.01
Stasis	11.62	16	17.12	0
Temperature (dO_{18})	-23.09	3	52.49	0
Oxygen (% atmos.)	-13.28	3	32.87	0

Table S32.

OLS regression: Mississippian divisions size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Actinopterygii	**Sarcopterygii**	**Tetrapoda**	**"Acanthodians"**	**Chondrichthyes**
N	103	35	40	31	145
Slope a	-0.0036	-0.0016	-0.0024	-0.0058	-0.018
Intercept b	-0.16	1.12	0.87	-0.14	-4.32
err a	0.0028	0.0093	0.0077	0.0093	0.0035
err b	0.95	3.14	2.57	3.17	1.18
r	-0.13	-0.031	-0.050	-0.12	-0.40
r^2	0.016	0.00094	0.0025	0.013	0.16
t	-1.29	-0.18	-0.31	-0.62	-5.16
p(uncorr)	0.20	0.86	0.76	0.54	***8.10E-07***
permut p	0.20	0.83	0.76	0.53	***0.0001***
95% CI on a	-0.0088/ 0.0019	-0.020/ 0.014	-0.018/ 0.012	-0.025/ 0.013	-0.025/ -0.012
95% CI on b	-1.92/ 1.70	-4.95/ 6.39	-4.39/ 5.68	-6.59/ 6.29	-6.59/ -2.25
Durbin-Watson	1.64	0.83	1.58	1.10	1.40
p(homosced.)	0.84	0.14	0.12	0.32	0.020

Table S33.

RMA regression: Mississippian divisions size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Actinopterygii	**Sarcopterygii**	**Tetrapoda**	**"Acanthodians"**	**Chondrichthyes**
N	103	35	40	31	145
Slope a	-0.029	-0.054	-0.047	-0.050	-0.045
Intercept b	-8.57	-16.38	-14.29	-15.35	-13.58
err a	0.0028	0.0093	0.0077	0.0092	0.0035
err b	0.91	9.89	6.69	10.069	1.39
r	-0.13	-0.031	-0.050	-0.12	-0.40
r^2	0.016	0.00094	0.0025	0.013	0.16
t	-1.29	-0.18	-0.31	-0.62	-5.16
p(uncorr)	0.20	0.86	0.76	0.54	***8.10E-07***
permut p	0.20	0.86	0.76	0.54	***0.0001***
95% CI on a	-0.087/ -0.023	-0.18/ -0.041	-0.16/ -0.036	-0.16/ -0.041	-0.050/ -0.40
95% CI on b	-28.36/ -6.66	-57.74/ -12.15	-50.5/ -10.33	-51.91/ -12.14	-15.28/ -11.76
Durbin-Watson	1.14	0.80	1.25	0.84	1.42
p(homosced.)	0.0057	0.91	0.16	0.58	0.71

Table S34.

OLS regressions: Mississippian "Acanthodian" and Chondrichthyes clades size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Acanthodida	**Gyracanthida**	***Gyracanthus***	**Holocephali**	**Elasmobranchii**
N	10	22	8	29	59
Slope a	0.013	-0.0089	0.014	-0.027	-0.021
Intercept b	5.58	-0.94	7.29	-7.50	-5.25
err a	0.0060	0.0096	0.0057	0.0088	0.0045
err b	2.026	3.28	1.98	2.95	1.52
r	0.60	-0.20	0.72	-0.51	-0.53
r^2	0.36	0.041	0.51	0.26	0.28
t	2.10	-0.93	2.51	-3.11	-4.68
p(uncorr)	0.069	0.37	***0.046***	***0.0043***	***1.79E-05***
permut p	0.077	0.37	***0.054***	***0.0046***	***0.0001***
95% CI on a	0.0020/ 0.025	-0.029/ -0.015	0.0057/ 0.022	-0.044/ -0.014	-0.031/ -0.012
95% CI on b	2.0082/ 9.70	-7.97/ -7.24	4.44/ 9.88	-12.92/ -2.95	-8.70/ -2.00
Durbin-Watson	2.27	2.00	2.41	1.76	1.67
p(homosced.)	0.77	0.011	0.072	0.71	0.0067

Table S35.

RMA regressions: Mississippian "Acanthodian" and Chondrichthyes clades size/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Acanthodida	**Gyracanthida**	***Gyracanthus***	**Holocephali**	**Elasmobranchii**
N	10	22	8	29	59
Slope a	0.021	-0.044	0.020	-0.053	-0.040
Intercept b	8.46	-12.88	9.26	-16.18	-11.64
err a	0.0060	0.0096	0.0057	0.0088	0.0045
err b	4.11	10.77	3.91	8.70	2.32
r	0.60	-0.20	0.72	-0.51	-0.53
r^2	0.36	0.041	0.51	0.26	0.28
t	2.10	-0.93	2.5108	-3.11	-4.68
p(uncorr)	0.069	0.37	***0.046***	***0.0044***	***1.79E-05***
permut p	0.08	0.37	***0.050***	***0.0056***	***0.0001***
95% CI on a	0.011/ 0.046	-0.13/ -0.029	0.0029/ 0.031	-0.064/ -0.036	-0.047/ -0.032
95% CI on b	5.20/ 16.87	-42.14/ -8.037	3.15/ 12.95	-19.95/ -10.53	-14.31/ -9.00
Durbin-Watson	1.93	1.24	2.34	1.33	1.25
p(homosced.)	0.25	0.067	0.15	0.99	0.17

Table S36.

OLS regressions: Mississippian Sarcopterygii clades sizes/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Rhizodontida	Dipnoi	Actinistia
N	14	4	14
Slope a	0.012	-0.0025	-0.046
Intercept b	6.12	0.97	-0.32
err a	0.010	0.0055	0.0052
err b	3.46	1.87	1.74
r	0.31	-0.31	-0.25
r^2	0.098	0.095	0.062
t	1.14	-0.46	-0.89
p(uncorr)	0.27	0.69	0.39
permut p	0.26	0.66	0.39
95% CI on a	-0.0063/ 0.034	-0.017/ 0.0095	-0.014/ -0.0041
95% CI on b	-0.16/ 13.55	-3.89/ 5.17	-3.44/ 2.52
Durbin-Watson	1.82	2.57	2.80
p(homosced.)	0.36	0.89	0.80

Table S37.

RMA regressions: Mississippian Sarcopterygii clades sizes/age. Confidence intervals from 1999 bootstrapped replicates. Body lengths (cm) transformed by Log_{10}.

	Rhizodontida	Dipnoi	Actinistia
N	14	4	14
Slope a	0.037	-0.0082	-0.019
Intercept b	14.78	-0.96	-5.010
err a	0.010	0.0055	0.0052
err b	11.98	3.51	3.038
r	0.31	-0.31	-0.25
r^2	0.098	0.095	0.062
t	1.14	-0.46	-0.89
p(uncorr)	0.27	0.69	0.39
permut p	0.27	0.67	0.39
95% CI on a	0.021/ 0.12	-0.035/ -0.0016	-0.062/ -0.0018
95% CI on b	9.51/ 43.76	-8.42/ 1.38	-19.55/ 0.56
Durbin-Watson	1.28	2.68	2.076
p(homosced.)	0.47	0.15	0.22

Table S38.

Mann-Whitney U-Tests: “Agnathan” and “Placoderm” clades. Body lengths (cm) transformed by Log_{10}.Monte Carlo p-values for each stage versus previous stage. Only comparisons of bins with more than four values included.

Stage	Heterostraci	Osteostraci	Arthrodira	Antiarcha	Ptyctodontida
Lockhovian					
Pragian	*0.071*	**0.0047**	0.96	0.71	
Emsian	0.47	**0.01**	*0.069*	0.93	
Eifelian	**0.0003**	0.83	0.13	0.14	
Givetian	0.9		0.4	0.88	0.16
Frasnian	1		**0.0082**	**0.001**	0.41
Famennian			**0.0001**	0.69	

Table S39.

Mann-Whitney U-Tests: “Acanthodian” and Chondrichthyes subclades. Body lengths (cm) transformed by Log_{10}.Monte Carlo p-values for each stage versus previous stage. Only comparisons of bins with more than four values included.

Stage	Climatiida	Ischnacanthida	Gyracanthida	Elasmobranchii	Holocephali
Lockhovian					
Pragian		0.19			
Emsian	0.65	0.43			
Eifelian	0.23				
Givetian	0.33				
Frasnian					
Famennian					
Tournaisian					
Visean			0.71	0.13	**0.048**
Serpukhovian			0.83	**0.006**	0.24

Table S40.

Mann-Whitney U-Tests: Sarcopterygii clades. Body lengths (cm) transformed by Log_{10}.Monte Carlo p-values for each stage versus previous stage. Only comparisons of bins with more than four values included.

Stage	Porolepiformes	Osteolepiforms	Dipnoi	Actinistia	Rhizodontida
Lockhovian					
Pragian					
Emsian					
Eifelian			0.15		
Givetian	0.77	**0.0045**	0.43		
Frasnian	0.6	*0.092*	0.14		
Famennian		0.29	*0.068*		
Tournaisian					
Visean					0.2
Serpukhovian				0.98	0.79

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